**Supporting Information for: Triple resonance-based $^{13}C^{\alpha}$ and $^{13}C^{\beta}$ CEST experiments for studies of ms timescale dynamics in proteins**

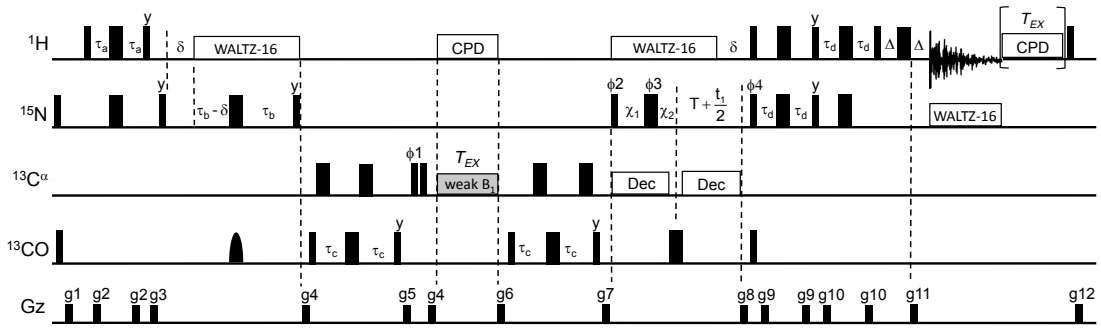



**Fig. S1** HNCOCA-based pulse scheme for the measurement of $^{13}C^{\alpha}$ CEST profiles in $^{15}N$,$^{13}C$ labeled proteins. Many of the details can be found in the legend to Fig. 1 and are not repeated here. $^{1}H$, $^{15}N$, $^{13}C$ carriers are placed at water, 119 ppm, and 176 ppm (CO), respectively, throughout the experiment with the exception of the CEST period when the $^{13}C$ carrier is jumped to a distinct $^{13}C^{\alpha}$ frequency. $^{13}C^{\alpha}$ and $^{13}CO$ rectangular pulses are applied with fields of $\zeta/\sqrt{3}$ (180°) or $\zeta/\sqrt{15}$ (90°) Hz where $\zeta$ is the distance in Hz between the centers of resonance of $^{13}C^{\alpha}$ (58 ppm) and $^{13}CO$ (176 ppm) spins (Kay et al. 1990). $^{13}C^{\alpha}$ decoupling is achieved using a WURST-2 adiabatic scheme (Kupce and Freeman 1995) with a bandwidth extending from 44-66 ppm and a maximum (rms) amplitude of 0.60 (0.36) kHz. The delays are set to: $\tau_a$ = 2.3 ms, $\tau_b$ = 12.75 ms, $\tau_c$ = 4 ms, $\tau_d$ = 2.3 ms, T = 14 ms, $\delta$ = 5.5 ms, $\Delta$ = 0.5 ms. The phase cycle is: $\phi_1 = (x, -x)$, $\phi_2 = x$, $\phi_3 = 2(x),2(-x)$, $\phi_4 = x$, receiver = $(x, -x)$. Gradient levels and durations (Gauss/cm; ms) are

g1 = (16; 0.5), g2 = (8; 0.5); g3= (20; 1); g4 = (-14; 1); g5 = (-30, 0.8); g6 = (-12; 0.6); g7 = (13, 0.4); g8 = (60; 1.25); g9 = (8; 0.3); g10= (4; 0.4); g11 = (59; 0.125); g12 = (16; 1). Quadrature detection in $F_1$ is achieved by recording a pair of data sets with ($\phi_4$,g8) and ($\phi_4$+180°,-g8) (Kay et al. 1992; Schleucher et al. 1993). For each successive $t_1$ point $\phi_2$ and the receiver phase are incremented by 180° (Marion et al. 1989).

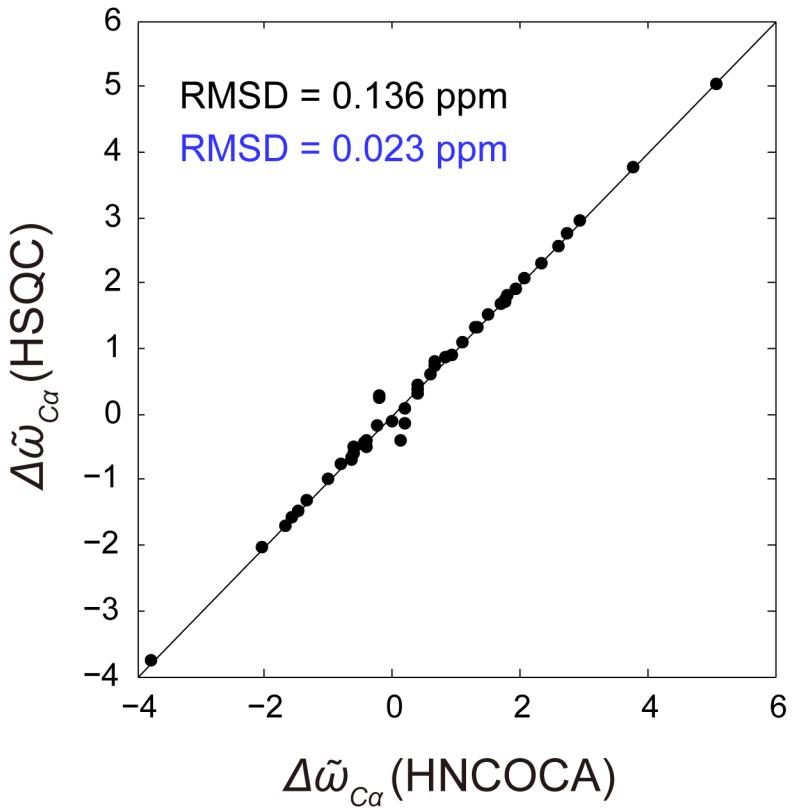



**Fig S2**. Comparison of excited state $^{13}C^{\alpha}$ chemical shifts from fits of HNCOCA-based (X-axis) and $^{13}C$-$^{1}H$ HSQC based (Y-axis) (Bouvignies et al. 2014) experiments. RMSD values include all residues (black), or only those for which $|\Delta\varpi| > 1$ ppm (blue).

## References


Bouvignies G, Vallurupalli P, Kay LE (2014) Visualizing side chains of invisible protein conformers by solution NMR J Mol Biol 426:763-774

Kay LE, Ikura M, Tschudin R, Bax A (1990) Three-dimensional triple-resonance NMR spectroscopy of isotopically enriched proteins J Magn Reson 89:496-514

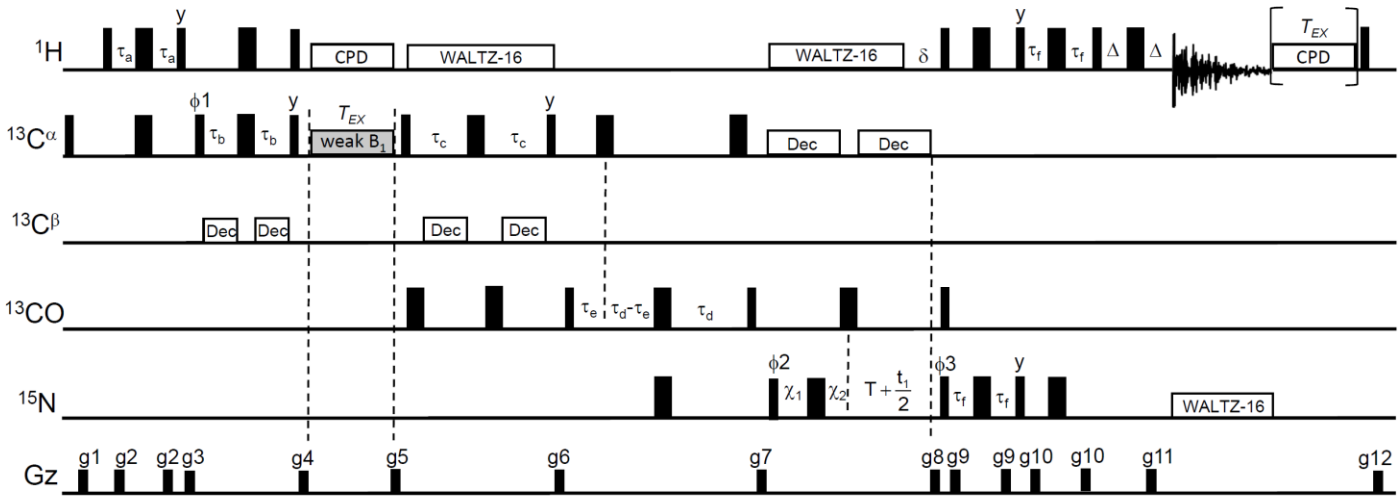
Kay LE, Keifer P, Saarinen T (1992) Pure absorption gradient enhanced heteronuclear single quantum correlation spectroscopy with improved sensitivity J Am Chem Soc 114:10663-10665

Kupce E, Freeman R (1995) Adiabatic pulses for wideband inversion and broadband decoupling J Magn Reson, Ser A 115:273-276

Marion D, Ikura M, Tschudin R, Bax A (1989) Rapid recording of 2D NMR spectra without phase cycling. Application to the study of hydrogen exchange in proteins J Magn Reson 85:393-399

Schleucher J, Sattler M, Griesinger C (1993) Coherence selection by gradients without signal attenuation: Application to the three-dimensional HNCO experiment Angew Chem Int Ed Engl 32:1489-1491

# HACACONNH CEST:




```
/*  hacaconnh_CEST_CA_lek_600.c

    This pulse sequence will allow one to perform the following experiment:

    2D hacaconnh (enhanced sensitivity PFG and with minimal perturbation of
       water) correlating n(i+1), nh(i+1) and getting CEST profiles of the
previous CB

                     F2       N (i+1)
                     F3(acq)  NH (i+1)

    Uses three channels:
    1)  1H             - carrier (tof) @ 4.7ppm [H2O]
    2) 13C             - carrier (dof @ 58ppm [CA] and dof_co @ 176ppm [CO])
    3) 15N             - carrier (dof2)@ 119ppm [centre of amide N]


    Set dm = 'nnnn', dmm = 'cccc'
    Set dm2 = 'nnny', dmm2 = 'cccp' [15N decoupling during acquisition]
                      dseq2 = 'waltz16'

    Must set phase = 1,2 and phase2 = 1,2 for States-TPPI
    acquisition in t1 [carbon]  and t2 [N]. [The fids must be manipulated
    (add/subtract) with 'grad_sort_nd' program (or equivalent) before regular
    processing.]

    Flags
         fsat      'y' for presaturation of H2O
         fscuba    'y' to apply scuba pulse after presaturation of H2O
         f1180     'y' to get 180deg linear phase correction in F1,
                       otherwise linear phase correction is 0.
         f2180     'y' to get 180deg linear phase correction in F2,
                       otherwise linear phase correction is 0.
```

```
    Standard Settings: fsat='n', fscuba='n', f1180='n', f2180='n'.

    Written by L.E.Kay on April 2, 2014

    Calibration of 13C pulses: Sit at 58 and then jump to 176 ppm Do CEST at dof

     Will not get glycines as written

       d_c90 - delta/sq(15) for 118 ppm 'a',
       d_c180 - delta/sq(3) for 118 ppm 'a'
       d_c180 - detlta/sq(3) for 118 ppm 'b'

       All pwc90 pulses are delta/sq(15) and pwc180 are delta/sq(3), irrespective
of tehe
        carrier position

        cadecseq applied when carrier is on CO, add 6 dB

  Min is a 2 step cycle. Set nt to a multiple of 2

  Array tauc to get max.

*/

#include <standard.h>

static int  phi1[2]  = {0,2},
            phi2[4]  = {0,0,2,2},
            phi11[1]  = {0},
            rec[4]  = {0,2,2,0};

static double d2_init=0.0, d3_init=0.0;

pulsesequence()
{
/* DECLARE VARIABLES */

 char       fsat[MAXSTR],
          fscuba[MAXSTR],
            f1180[MAXSTR],    /* Flag to start t1 @ halfdwell            */
            f2180[MAXSTR],    /* Flag to start t2 @ halfdwell            */
            spca180b[MAXSTR],
            cadecseq[MAXSTR],
            H_heat[MAXSTR],
            spco180a[MAXSTR],
            cbdecseq[MAXSTR],
            purge_flg[MAXSTR];


 int         phase, phase2, ni, ni2, icosel,  /* used to get n and p type */
             t1_counter,   /* used for states tppi in t1           */
             t2_counter;   /* used for states tppi in t2           */

 double      tau1,         /*  t1 delay */
             tau2,         /*  t2 delay */
             taua,         /*  ~ 1/4JCH =  1.7 ms */
             taub,         /*   1/4JCH =  */
```

```
tauc,          /* ~ 1/4JC'CA = 4.3, 4.4 ms */
taud,          /* ~ 1/4JC'N = 12.4 ms */
taue,          /* = 1/4JC'CA = 5.0 ms    */
tauf,          /* 1/4JNH = 2.25 ms */
BigTN,         /* nitrogen constant time period */

pwn,           /* PW90 for 15N pulse              */
pwc90,
pwc180,

tsatpwr,       /* low level 1H trans.power for presat  */
tpwrml,        /* power level for h decoupling  */
pwmlev,        /* h 90 pulse at tpwrml            */
dhpwr,

d_c90,
d_c180,

dhpwr2,        /* high dec2 pwr for 15N hard pulses    */

sw1,           /* sweep width in f1                    */
sw2,           /* sweep width in f2                    */


dof_co,         /* dof at CO  */

pwcadec,      /* seduce ca decoupling at dpwrsed        */
dpwrsed,      /* power level for seduce ca decoupling   */
dressed,      /* resoln for seduce decoupling  = 2      */

sphase1,      /* phase shift 1  */
sphase2,      /* phase shift 2  */

BigT1,

deltaC,
time_sl,

omega_sl,

aa_sl, dec_sl, bb_sl, cc_sl,

tpwr_waltz,
pw_waltz,

time_sl_max,

tau_eq,

d_cbdec,
pwcbdec,
drescb,

gt1,
gt2,
gt3,
gt4,
```

```
            gt5,
            gt6,
            gt7,
            gt8,
            gt9,
            gt10,
            gt11,

            gzlvl1,
            gzlvl2,
            gzlvl3,
            gzlvl4,
            gzlvl5,
            gzlvl6,
            gzlvl7,
            gzlvl8,
            gzlvl9,
            gzlvl10,
            gzlvl11;

/* LOAD VARIABLES */

  getstr("fsat",fsat);
  getstr("f1180",f1180);
  getstr("f2180",f2180);
  getstr("fscuba",fscuba);
  getstr("spca180b",spca180b);
  getstr("cadecseq",cadecseq);

  getstr("H_heat",H_heat);

  getstr("spco180a",spco180a);
  getstr("cbdecseq",cbdecseq);
  getstr("purge_flg",purge_flg);

  taua   = getval("taua");
  taub   = getval("taub");
  tauc   = getval("tauc");
  taud   = getval("taud");
  taue   = getval("taue");
  tauf   = getval("tauf");

  BigTN  = getval("BigTN");
  pwc90 = getval("pwc90");
  pwc180 = getval("pwc180");

  pwn = getval("pwn");
  pwmlev = getval("pwmlev");
  tpwr = getval("tpwr");
  tsatpwr = getval("tsatpwr");
  tpwrml  = getval("tpwrml");
  dhpwr = getval("dhpwr");

  d_c90 = getval("d_c90");
  d_c180 = getval("d_c180");

  dpwr = getval("dpwr");
```

```
  dhpwr2 = getval("dhpwr2");

  phase = (int) ( getval("phase") + 0.5);
  phase2 = (int) ( getval("phase2") + 0.5);
  sw1 = getval("sw1");
  sw2 = getval("sw2");

  dof_co = getval("dof_co");

  ni = getval("ni");
  ni2 = getval("ni2");
  pwcadec = getval("pwcadec");
  dpwrsed = getval("dpwrsed");
  dressed = getval("dressed");

  BigT1 = getval("BigT1");
  sphase1 = getval("sphase1");
  sphase2 = getval("sphase2");

  tau_eq = getval("tau_eq");
  time_sl = getval("time_sl");
  deltaC = getval("deltaC");
  omega_sl = getval("omega_sl");

  time_sl_max = getval("time_sl_max");
  tpwr_waltz = getval("tpwr_waltz");
  pw_waltz = getval("pw_waltz");

  d_cbdec = getval("d_cbdec");
  pwcbdec = getval("pwcbdec");
  drescb = getval("drescb");

  gt1 = getval("gt1");
  gt2 = getval("gt2");
  gt3 = getval("gt3");
  gt4 = getval("gt4");
  gt5 = getval("gt5");
  gt6 = getval("gt6");
  gt7 = getval("gt7");
  gt8 = getval("gt8");
  gt9 = getval("gt9");
  gt10 = getval("gt10");
  gt11 = getval("gt11");

  gzlvl1 = getval("gzlvl1");
  gzlvl2 = getval("gzlvl2");
  gzlvl3 = getval("gzlvl3");
  gzlvl4 = getval("gzlvl4");
  gzlvl5 = getval("gzlvl5");
  gzlvl6 = getval("gzlvl6");
  gzlvl7 = getval("gzlvl7");
  gzlvl8 = getval("gzlvl8");
  gzlvl9 = getval("gzlvl9");
  gzlvl10 = getval("gzlvl10");
  gzlvl11 = getval("gzlvl11");

/* LOAD PHASE TABLE */
```

```
  settable(t1,2,phi1);
  settable(t2,4,phi2);
  settable(t11,1,phi11);
  settable(t10,4,rec);

/* CHECK VALIDITY OF PARAMETER RANGES */

    if((dm[A] == 'y' || dm[B] == 'y' || dm[C] == 'y' || dm[D] == 'y' ))
    {
        printf("incorrect dec1 decoupler flags!  ");
        abort(1);
    }

    if((dm2[A] == 'y' || dm2[B] == 'y' || dm2[C] == 'y'))
    {
        printf("incorrect dec2 decoupler flags! Should be 'nnny' ");
        abort(1);
    }

    if( pwmlev < 30.0e-6 )
    {
        printf("too much power during proton mlev sequence\n");
        abort(1);
     }

    if( tpwrml > 53 )
     {
        printf("tpwrml is too high\n");
        abort(1);
     }

    if( tsatpwr > 6 )
    {
        printf("TSATPWR too large !!!  ");
        abort(1);
    }

    if( dpwr > -16 )
    {
        printf("don't fry the probe, DPWR too large!  ");
        abort(1);
    }

    if( dpwr2 > 46 )
    {
        printf("don't fry the probe, DPWR2 too large!  ");
        abort(1);
    }

    if( dhpwr2 > 62 )
    {
        printf("don't fry the probe, DHPWR2 too large!  ");
        abort(1);
    }

    if( pw > 200.0e-6 )
```

```
    {
        printf("dont fry the probe, pw too high ! ");
        abort(1);
    }
    if( pwmlev > 200.0e-6 )
    {
        printf("dont fry the probe, pwmlev too high ! ");
        abort(1);
    }
    if( pwn > 200.0e-6 )
    {
        printf("dont fry the probe, pwn too high ! ");
        abort(1);
    }

    if( pwc90 > 100.0e-6 )
    {
        printf("dont fry the probe, pwc90 too high ! ");
        abort(1);
    }

    if( pwc180 > 100.0e-6 )
    {
        printf("dont fry the probe, pwc180 too high ! ");
        abort(1);
    }

    if( pwcadec > 500.0e-6 || pwcadec < 35.0e-6 )
    {
        printf("pwcadec outside reasonable limits: < 500e-6 > 200e-6 \n");
        abort(1);
    }

    if( dpwrsed > 50 )
    {
        printf("dpwrsed is too high\n");
        abort(1);
    }

    if(time_sl > 0.3) {
      printf("time_sl < 0.3\n");
      abort(1);
    }

    if(time_sl_max > 0.35) {
      printf("time_sl_max < 0.35\n");
      abort(1);
    }

    if(tpwr_waltz > 55) {
      printf("tpwr_waltz is too high; < 56\n");
      abort(1);
    }

    if( gt1 > 5e-3 || gt2 > 5e-3 || gt3 >5e-3 || gt4 > 5e-3 || gt5 > 5e-3 ||
gt6 > 5e-3
```

```
           || gt7 > 5e-3 || gt8 > 5e-3 || gt9 > 5e-3 || gt10 > 5e-3 || gt11 > 5e-
3)
    {
        printf("all gti values must be < 15e-3\n");
        abort(1);
    }

    if(d_c90 > 55) {
       printf("d_c90 is too high; < 56\n");
       abort(1);
    }

    if(d_c180 > 59) {
       printf("d_c180 is too high; < 60\n");
       abort(1);
    }

/*  Phase incrementation for hypercomplex 2D data */

    if (phase == 2) {
     }

    if (phase2 == 2) {
      tsadd(t11,2,4);
      icosel = 1;
    }
    else icosel = -1;

/*  Set up f1180  tau1 = t1               */

    tau1 = d2;
    if(f1180[A] == 'y') {
        tau1 += ( 1.0 / (2.0*sw1) );
        if(tau1 < 0.2e-6) tau1 = 0.0;
    }
        tau1 = tau1/2.0;

/*  Set up f2180  tau2 = t2               */

    tau2 = d3;
    if(f2180[A] == 'y') {
        tau2 += ( 1.0 / (2.0*sw2) );
        if(tau2 < 0.2e-6) tau2 = 0.0;
    }
        tau2 = tau2/2.0;

/* Calculate modifications to phases for States-TPPI acquisition          */

   if( ix == 1) d2_init = d2 ;
   t1_counter = (int) ( (d2-d2_init)*sw1 + 0.5 );
   if(t1_counter % 2) {
    }

   if( ix == 1) d3_init = d3 ;
   t2_counter = (int) ( (d3-d3_init)*sw2 + 0.5 );
   if(t2_counter % 2) {
      tsadd(t2,2,4);
```

```
      tsadd(t10,2,4);
    }

/* adjust 13C sl powers  */
aa_sl = d_c90 + 20.0*log10(omega_sl/(1.0/(4.0*pwc90))) + 6.0;
dec_sl = floor(aa_sl);
bb_sl = -1.0*(dec_sl - (aa_sl - 6.0));

cc_sl = pow(10,bb_sl/20.0)*4095.0;

/* BEGIN ACTUAL PULSE SEQUENCE */

status(A);
   decoffset(dof);       /* initially pulse at 43 ppm */
   decpower(dhpwr);        /* Set Dec1 power for hard 13C pulses         */
   dec2power(dhpwr2);      /* Set Dec2 power for 15N hard pulses         */

   if(H_heat[A] == 'y') {

    obspower(tpwr_waltz);

    if(deltaC <= -10000) {
        obsunblank();
        obsprgon("CP9024090",pw_waltz,30.0);
        xmtron();
        delay(time_sl_max);
        xmtroff();
        obsprgoff();
        obsblank();
      }

      else if(time_sl_max - time_sl >= 0.2e-6) {
        obsunblank();
        obsprgon("CP9024090",pw_waltz,30.0);
        xmtron();
        delay(time_sl_max - time_sl);
        xmtroff();
        obsprgoff();
        obsblank();
      }

    }

/* now ensure that there is no 1H mag left */

    obspower(tpwr);
    rgpulse(pw,zero,4.0e-6,0.0);

   delay(2.0e-6);
   rgradient('z',gzlvl1);
   delay(gt1*2.0);
   rgradient('z',0.0);
   delay(250.0e-6);

/* Presaturation Period */

status(B);
```

```
   if (fsat[A] == 'y')
   {
        obspower(tsatpwr);      /* Set transmitter power for 1H presaturation */
      delay(2.0e-5);
        rgpulse(d1,zero,rof1,rof1);
      obspower(tpwr);      /* Set transmitter power for hard 1H pulses */
      delay(2.0e-5);
      if(fscuba[A] == 'y')
      {
           delay(2.2e-2);
           rgpulse(pw,zero,2.0e-6,0.0);
           rgpulse(2*pw,one,2.0e-6,0.0);
           rgpulse(pw,zero,2.0e-6,0.0);
           delay(2.2e-2);
      }
   }
   else
   obspower(tpwr);           /* Set transmitter power for hard 1H pulses */
   delay(d1);
   txphase(zero);
   delay(1.0e-5);

/* Begin Pulses */

status(C);

   rcvroff();
   delay(20.0e-6);

/* ensure that magnetization originates on H and not 13C  */
   decpower(d_c90);
   decrgpulse(pwc90,zero,2.0e-6,0.0);

   delay(0.2e-6);
   rgradient('z',gzlvl1);
   delay(gt1);
   rgradient('z',0.0);
   delay(250.0e-6);


   rgpulse(pw,zero,0.0,0.0);                    /* 90 deg 1H pulse */

   delay(0.2e-6);
   rgradient('z',gzlvl2);
   delay(gt2);
   rgradient('z',0.0);
   delay(150.0e-6);

   decpower(d_c180);

   delay(taua - gt2 - 150.2e-6 - POWER_DELAY);

   simpulse(2.0*pw,pwc180,zero,zero,0.0,0.0);

   delay(0.2e-6);
   rgradient('z',gzlvl2);
   delay(gt2);
```

```
   rgradient('z',0.0);
   delay(150.0e-6);

   delay(taua - gt2 - 152.2e-6);

   rgpulse(pw,one,0.0,0.0);

   delay(0.2e-6);
   rgradient('z',gzlvl3);
   delay(gt3);
   rgradient('z',0.0);
   delay(250.0e-6);

   decpower(d_c90);
   decrgpulse(pwc90,t1,2.0e-6,0.0);
   decphase(zero);

   /* turn on Cb decoupling */
   decpower(d_cbdec);
   decprgon(cbdecseq,pwcbdec,drescb);
   decon();
   /* turn on Cb decoupling */

   delay(taub - POWER_DELAY - PRG_START_DELAY - PRG_STOP_DELAY - POWER_DELAY -
2.0e-6);
      /* CB DEC off */
      decoff();
      decprgoff();
      /* CB DEC off */

   /* adjust phase */
   initval(1.0,v3);
   decstepsize(sphase1);
   dcplrphase(v3);
   /* adjust phase */

   decpower(d_c180);
   simpulse(2.0*pw,pwc180,zero,zero,2.0e-6,0.0);
   dcplrphase(zero);

   /* turn on Cb decoupling */
   decpower(d_cbdec);
   decprgon(cbdecseq,pwcbdec,drescb);
   decon();
   /* turn on Cb decoupling */

   delay(taub - POWER_DELAY - PRG_START_DELAY - PRG_STOP_DELAY - POWER_DELAY -
2.0e-6);
      /* CB DEC off */
      decoff();
      decprgoff();
      /* CB DEC off */

   decpower(d_c90);
   decrgpulse(pwc90,one,2.0e-6,0.0);

   rgpulse(pw,zero,2.0e-6,0.0);
```

```
delay(0.2e-6);
rgradient('z',gzlvl4);
delay(gt4);
rgradient('z',0.0);
delay(250.0e-6);

/* NOW do the CEST */

delay(tau_eq);

  decpower(dec_sl); decpwrf(cc_sl); decphase(zero);
  obspower(tpwr_waltz);

  decoffset(dof + deltaC);

  delay(2.0e-6);

    if(time_sl > 0.2e-6 && deltaC > -10000) {
     obsprgon("CP9024090",pw_waltz,30.0);
     xmtron();
     if(omega_sl > 0.0);
       decon();

       delay(time_sl);
       xmtroff();
       obsprgoff();

      if(omega_sl > 0.0)
       decoff();
    }

  decpwrf(4095.0);
  decoffset(dof);

delay(tau_eq);

/* End of CEST */

delay(5.0e-6);

delay(0.2e-6);
rgradient('z',gzlvl5);
delay(gt5);
rgradient('z',0.0);
delay(250.0e-6);

/* H decoupling on */
obspower(tpwrml);
obsprgon("waltz16",pwmlev,90.0);
xmtron();    /* TURN ME OFF  DONT FORGET  */
/* H decoupling on */

decpower(d_c90);
decrgpulse(pwc90,zero,2.0e-6,0.0);

/* BS PULSE */
```

```
decpower(d_c180);
decshaped_pulse(spco180a,pwc180,zero,2.0e-6,2.0e-6);

/* turn on Cb decoupling */
decpower(d_cbdec);
decprgon(cbdecseq,pwcbdec,drescb);
decon();
/* turn on Cb decoupling */

delay(tauc - POWER_DELAY - WFG_START_DELAY - 2.0e-6 - pwc180 - WFG_STOP_DELAY
        - 2.0e-6 - POWER_DELAY
        - PRG_START_DELAY - PRG_STOP_DELAY - POWER_DELAY - 2.0e-6);

   /* CB DEC off */
   decoff();
   decprgoff();
   /* CB DEC off */

/* adjust phase */
initval(1.0,v4);
decstepsize(sphase1);
dcplrphase(v4);
/* adjust phase */

decpower(d_c180);
decrgpulse(pwc180,zero,2.0e-6,0.0);
dcplrphase(zero);

decshaped_pulse(spco180a,pwc180,zero,2.0e-6,2.0e-6);

/* turn on Cb decoupling */
decpower(d_cbdec);
decprgon(cbdecseq,pwcbdec,drescb);
decon();
/* turn on Cb decoupling */

delay(tauc - WFG_START_DELAY - 2.0e-6 - pwc180 - WFG_STOP_DELAY
        - 2.0e-6 - POWER_DELAY
        - PRG_START_DELAY - PRG_STOP_DELAY - POWER_DELAY - 2.0e-6);

   /* CB DEC off */
   decoff();
   decprgoff();
   /* CB DEC off */

decpower(d_c90);
decrgpulse(pwc90,one,2.0e-6,0.0);

/* H decoupling off */
xmtroff();
obsprgoff();
/* H decoupling off */

delay(0.2e-6);
rgradient('z',gzlvl6/2.0);
delay(gt6);
rgradient('z',0.0);
```

```
   delay(250.0e-6);

   decoffset(dof_co);

   decpower(d_c90);
   decrgpulse(pwc90,zero,2.0e-6,0.0);

   delay(taue - POWER_DELAY - 2.0e-6 - WFG_START_DELAY - pwc180 -
WFG_STOP_DELAY);

   decpower(d_c180);
   decshaped_pulse(spca180b,pwc180,zero,2.0e-6,0.0);

   /* adjust phase */
   initval(1.0,v5);
   decstepsize(sphase2);
   dcplrphase(v5);
   /* adjust phase */

   delay(taud - taue);

   decrgpulse(pwc180,zero,0.0,0.0);
   dec2rgpulse(2.0*pwn,zero,2.0e-6,0.0);
   dcplrphase(zero);

   delay(taud - 2.0e-6 - 2.0*pwn - 2.0e-6
            - WFG_START_DELAY - pwc180 - WFG_STOP_DELAY - 2.0e-6
            - POWER_DELAY - 2.0e-6);

   decshaped_pulse(spca180b,pwc180,zero,2.0e-6,2.0e-6);

   decpower(d_c90);
   decrgpulse(pwc90,zero,2.0e-6,0.0);

   if(purge_flg[A] == 'y') {

   obspower(53.0);
   rgpulse(.002,zero,2.0e-6,0.0);
   rgpulse(.003,one,2.0e-6,0.0);

   delay(0.2e-6);
   rgradient('z',gzlvl11);
   delay(gt11);
   rgradient('z',0.0);
   delay(250.0e-6);

   obspower(tpwr);
   rgpulse(pw,zero,2.0e-6,0.0);

   delay(0.2e-6);
   rgradient('z',gzlvl11);
   delay(gt11/2.0);
   rgradient('z',0.0);
   delay(250.0e-6);

  }
```

```
obspower(tpwrml);
txphase(zero);
delay(2.0e-6);

/* H decoupling on */
obsprgon("waltz16",pwmlev,90.0);
xmtron();
/* H decoupling on */

/* CA dec on */
decpower(dpwrsed);
decprgon(cadecseq,pwcadec,dressed);
decon();
/* CA dec on */

dec2rgpulse(pwn,t2,2.0e-6,0.0);
dec2phase(zero); decphase(zero);

if(BigTN - tau2 >= 0.2e-6)  {

   delay(BigTN - tau2);

   /* CA DEC off */
   decoff();
   decprgoff();
   /* CA DEC off */

   dec2rgpulse(2*pwn,zero,0.0,0.0);
   decpower(d_c180);
   decrgpulse(pwc180,zero,4.0e-6,2.0e-6);

/* CA dec on */
decpower(dpwrsed);
decprgon(cadecseq,pwcadec,dressed);
decon();
/* CA dec on */

  delay(BigTN + tau2
     - POWER_DELAY - 4.0e-6
     - pwc180 - 2.0e-6
     - 5.5e-3
     + PRG_STOP_DELAY - POWER_DELAY - PRG_START_DELAY);

  dec2phase(t11);

/* H decoupling off */
xmtroff();
obsprgoff();
/* H decoupling off */

obspower(tpwr);

delay(5.5e-3 - PRG_STOP_DELAY
      - POWER_DELAY - 0.2e-6 - gt7 - 1000e-6
      - 2.0*GRADIENT_DELAY - PRG_STOP_DELAY);

   /* CA DEC off */
```

```
   decoff();
   decprgoff();
   /* CA DEC off */

}

else {

   dec2rgpulse(2*pwn,zero,2.0e-6,2.0e-6);

   delay(tau2 - BigTN);

   /* CA DEC off */
   decoff();
   decprgoff();
   /* CA DEC off */

   decpower(d_c180);
   decrgpulse(pwc180,zero,4.0e-6,2.0e-6);

/* CA dec on */
decpower(dpwrsed);
decprgon(cadecseq,pwcadec,dressed);
decon();
/* CA dec on */

  delay(BigTN + tau2
     - POWER_DELAY - 4.0e-6
     - pwc180 - 2.0e-6
     - 5.5e-3 - PRG_STOP_DELAY - POWER_DELAY - PRG_START_DELAY);

  dec2phase(t11);

/* H decoupling off */
xmtroff();
obsprgoff();
/* H decoupling off */

obspower(tpwr);

delay(5.5e-3 - PRG_STOP_DELAY
      - POWER_DELAY - 0.2e-6 - gt7 - 1000e-6
      - 2.0*GRADIENT_DELAY - PRG_STOP_DELAY);

   /* CA DEC off */
   decoff();
   decprgoff();
   /* CA DEC off */

}

delay(0.2e-6);
rgradient('z',icosel*gzlvl7);
delay(gt7);
rgradient('z',0.0);
delay(1000.0e-6);
```

```
sim3pulse(pw,0.0e-6,pwn,zero,zero,t11,0.0,0.0);

decpower(d_c90);
decrgpulse(pwc90,zero,4.0e-6,0.0);

delay(0.2e-6);
rgradient('z',gzlvl8);
delay(gt8);
rgradient('z',0.0);
delay(2.0e-6);

dec2phase(zero);
delay(tauf - POWER_DELAY - 4.0e-6
          - pwc90 - gt8 - 2.2e-6);

sim3pulse(2.0*pw,0.0e-6,2.0*pwn,zero,zero,zero,0.0,0.0);

txphase(one);
dec2phase(one);

delay(tauf - gt8 - 200.2e-6);

delay(0.2e-6);
rgradient('z',gzlvl8);
delay(gt8);
rgradient('z',0.0);
delay(200.0e-6);

sim3pulse(pw,0.0e-6,pwn,one,zero,one,0.0,0.0);

delay(0.2e-6);
rgradient('z',gzlvl9);
delay(gt9);
rgradient('z',0.0);
delay(2.0e-6);

txphase(zero);
dec2phase(zero);

delay(tauf - gt9 - 2.2e-6 - 0.5*(pwn-pw));

sim3pulse(2.0*pw,0.0e-6,2.0*pwn,zero,zero,zero,0.0,0.0);

delay(tauf - gt9 - 200.2e-6);

delay(0.2e-6);
rgradient('z',gzlvl9);
delay(gt9);
rgradient('z',0.0);
delay(200.0e-6);

rgpulse(pw,zero,0.0,0.0);

delay(BigT1);

rgpulse(2*pw,zero,0.0,0.0);
```

```
   delay(2.0e-6);
   rgradient('z',gzlvl10);
   delay(gt10);
   rgradient('z',0.0);
   delay(100.0e-6);

   delay(BigT1 - gt10 - 2.0*POWER_DELAY - 102.0e-6 - 2.0*GRADIENT_DELAY);

   dec2power(dpwr2);  /* set power for 15N decoupling */
   decpower(dpwr);

/*   rcvron();  */          /* Turn on receiver to warm up before acq */

/* BEGIN ACQUISITION */

status(D);
         setreceiver(t10);

}
```

```
gzlvl6 1 1 32768 -32768 1 2 1 0 1 64
1 -10000
0
dn3 2 2 8 0 0 2 1 8 1 64
1 ""
0
dco90pwr 7 1 32767 0 0 2 1 0 1 64
1 52
0
cr 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 -451174.246875
0
axisf 4 2 4 0 0 4 1 0 1 64
1 "s"
4 "m" "n" "s" "u"
arraydim 7 1 32768 1 1 2 1 5 1 64
1 5
0
acqstatus 7 1 32767 0 0 2 1 0 1 64
2 16 16
0
acqcycles 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 5
0
BigTN 3 1 14 14 14 2 1 8192 1 64
1 0.0124
0
BigT1 3 1 14 14 14 2 1 8192 1 64
1 0.0005
0
H_heat 2 2 8 0 0 2 1 0 1 64
1 "y"
0
acqdim 7 1 1000000000 -1000000000 0 2 1 0 1 64
1 1
0
alfa 6 1 8192 -8192 1e-07 2 1 8194 1 64
1 6.6
0
aig 2 2 2 0 0 4 1 1 1 64
1 "ai"
2 "nm" "ai"
ap 2 2 1023 0 0 4 1 6 1 64
1 "1:SAMPLE:date,solvent,file;1:3D
ACQUISITION:sw:1,sw1:1,sw2:1,ni:0,ni2:0,phase:0,phase2:0,at:3,np:0,ss:0,nt:0,ct:0
;1:CHANNEL 1:sfrq:3,tn,tof:1,tpwr:0,mlevpwr:0,tsatpwr:0,pw:1,pwmlev:1;1:CHANNEL
2:dfrq:3,dn,dof:1,dpwr:0,dlowpwr:0,pwx1:1,dm,dmm,dmf:0,dseq,homo;2:DELAYS:d1:3,d2
:3,d3:3,hscuba:3,mixnoe:3,mixshift:3,mixmlev:3,trim:3,jxh:1;1:FLAGS:fscuba,fmlev,
fnoesy,dp,hs;2:2D DISPLAY:sp1:1,wp1:1,sc2:0,wc2:0,rfl1:1,rfp1:1;2:DEC. &
VT:dn:2,dof:1,dm,dmm,dmf,dpwr(dpwr):0,pwxlvl:0,pwx:1,dlp(dlp):0,homo,temp(temp):1
,satflg,satdly:3,satfrq:1,satpwr:0;2:PROCESSING:cf(nf):0,lb(lb):2,sb(sb):3,sbs(sb
):3,gf(gf):3,gfs(gf):3,awc(awc):3,lsfid(lsfid):0,phfid(phfid):1,wtfile,proc,fn:0,
math,,werr,wexp,wbs,wnt;2(ni):2D
PROCESSING:lb1(lb1):2,sb1(sb1):3,sbs1(sb1):3,gf1(gf1):3,gfs1(gf1):3,awc1(awc1):3,
wtfile1,proc1,fn1:0;2:DISPLAY:sp:1,wp:1,vs:0,sc:0,wc:0,hzmm:2,is:2,rfl:1,rfp:1,th
:0,ins:3,aig*,dcg*,dmg*;"
0
```

```
alock 2 2 8 0 0 2 1 0 1 64
1 "n"
5 "a" "n" "s" "u" "y"
array 2 2 256 0 0 2 1 1 1 64
1 "sphase2"
0
awc 1 1 1 -1 0.001 3 1 1 0 64
1 0
0
arrayelemts 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 1
0
at 1 1 14 14 14 2 1 8203 1 64
1 0.0640008
0
awc2 1 1 1 -1 0.001 3 1 1 0 64
1 0
0
awc1 1 1 1 -1 0.001 3 1 1 0 64
1 0
0
axis 4 2 4 0 0 4 1 0 1 64
1 "pd"
11 "c" "d" "1" "2" "3" "h" "k" "m" "n" "p" "u"
cofrq 5 1 1000000000 -1000000000 0 2 1 0 1 64
1 10800
0
cadecseq 2 2 8 0 0 2 1 0 1 64
1 "seduce1_118p_sa"
0
c13_de 3 1 14 14 14 2 1 8192 1 64
1 0.001
0
bs 7 1 32767 0 1 2 1 0 1 64
1 16
0
celem 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
0
cbdecseq 2 2 8 0 0 2 1 0 1 64
1 "sa_cbdec"
0
cf 7 1 32767 0 1 3 1 1 0 64
1 1
0
console 2 2 8 0 0 2 1 0 1 64
1 "inova"
0
cp 2 2 1 0 0 2 1 0 1 64
1 "y"
2 "y" "n"
d3 3 1 14 14 14 2 1 8194 1 64
1 0
0
cutoff 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 0 64
1 200
0
```

```
crf 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0.000164524421594
0
cr2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0
0
cr1 1 1 1000000000 -1000000000 0 4 1 3 1 64
1 7653.998132
0
ct 7 1 1000000000 0 1 2 1 6 1 64
1 0
0
d2 3 1 14 14 14 2 1 8194 1 64
1 0
0
d1 3 1 14 14 14 2 1 8194 1 64
1 2
0
dataProcessed 1 1 9.99999984307e+17 -9.99999984307e+17 0 3 1 0 1 64
1 0
0
d_c90 1 1 9 9 9 2 1 8192 1 64
1 48
0
d_c180 1 1 9 9 9 2 1 8192 1 64
1 55
0
d_cbdec 1 1 9 9 9 2 1 8192 1 64
1 35
0
date 2 2 9 0 0 2 1 1 1 64
1 "Apr  9 2014"
0
dataid 2 2 8 0 0 2 1 0 1 64
1 ""
0
dcapwr 7 1 77 0 1 2 1 0 1 64
1 64
0
datname 2 2 8 0 0 3 1 0 1 64
1 ""
0
dcg 2 2 3 0 0 4 1 1 1 64
1 ""
2 "dc" "cdc"
dm 4 2 4 0 0 2 1 0 1 64
1 "nnnn"
4 "a" "n" "s" "y"
dg1 2 2 1023 0 0 4 1 6 1 64
1
"1:DISPLAY:sp:1,wp:1,vs:0;1:REFERENCE:rfl:1,rfp:1,cr:1,delta:1;1:PHASE:lp:1,rp:1,
rp1(ni):1,lp1(ni):1;2:CHART:sc:0,wc:0,hzmm:2,vp:0,axis,pltmod,,th:0,,ho:2,vo:2,,r
plot,trace:2;3(ni):2D:sp1:1,wp1:1,sc2:0,wc2:0,rfl1:1,rfp1:1;3:FLAGS:aig*,dcg*,dmg
*;3:FID:sf:3,wf:3,vf:0;4:INTEGRAL:intmod,is:2,ins:3,io:0,,lvl:3,tlt:3;"
0
deltafrq 5 1 1000000000 -1000000000 0 2 1 0 1 64
1 -19000
```

```
0
delta2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0
0
decfrq 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 -3000
0
dcodpwr 7 1 61 0 0 2 1 0 1 64
1 57
0
deltaf 1 1 100 0 0 4 1 0 1 64
1 0.00296542986425
0
deltaC 5 1 1000000000 -1000000000 0 2 1 0 1 64
1 -12000
0
dfrq 5 1 1000000000 -1000000000 0 2 1 8 1 64
1 150.5774115
0
deltaone 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
0
dfrq3 1 1 1000000000 0 0 2 1 9 1 64
1 0
0
dfrq2 1 1 1000000000 0 0 2 1 9 1 64
1 60.6833573
0
dg 2 2 1023 0 0 4 1 6 1 64
1 "1:SAMPLE:date;1:3D
ACQUISITION:sw:1,sw1:1,sw2:1,ni:0,ni2:0,phase:0,phase2:0,np:0,ss:0,nt:0,at:3,time
_sl:3,time_sl_max:3,omega_sl:1;2:SPECIAL:gain,temp:1,H_heat,seqfil;2:DELAYS:tau_e
q:4,taua:4,taub:5,tauc:4,taud:4,taue:4,tauf:4,BigTN:4,BigT1:4,d1:3,d2:6,d3:6,tin,
vtwait;3:CHANNEL
1:sfrq:3,tn,tof:1,tpwr:0,tpwr_waltz:0,tsatpwr:0,tpwrml:0,pw:2,pw_waltz:1,pwmlev:2
,alfa:1;3:FLAGS:fsat,fscuba,f1180,f2180,purge_flg;4:CHANNEL
3:dfrq2:3,dn2,dof2:1,dhpwr2:0,dpwr2:0,pwn:2,dm2,dmm2,dmf2,dseq2,dres2;"
0
dhpwr 1 1 9 9 9 2 1 8192 1 64
1 63
0
dgs 2 2 1023 0 0 4 1 6 1 64
5 "1:AXIAL SHIMS:z1:0,z2:0,z3:0,z4:0,z5:0,z6:0,z7:0;"
"2:NON AXIAL
SHIMS:x1:0,y1:0,xz:0,yz:0,xy:0,x2y2:0,x3:0,y3:0,xz2:0,yz2:0,zxy:0,zx2y2:0,z3x:0,z
3y:0,z2x2y2:0,z2xy:0;"
"3:NON AXIAL
SHIMS:zx3:0,zy3:0,x4:0,y4:0,z4x:0,z4y:0,z3x2y2:0,z3xy:0,z2x3:0,z2y3:0,z3x3:0,z3y3
:0,z4x2y2:0,z4xy:0,z5x:0,z5y:0;"
"4:AUTOMATION:method,wshim,load,,spin:0,gain:0,alock,loc:0;"
"4:SPECIAL:temp;"
0
dg2 2 2 1023 0 0 4 1 7 1 64
1 "1:CHANNEL
2:dfrq:3,dn,dof:1,dof_co:1,dhpwr:0,dpwr:0,dpwrsed,d_c90:0,pwc90:1,d_c180:0,pwc180
:1,spco180a,spca180b,pwcadec,dseq,dm,dmm,dres,dressed,dmf,sphase1:1,sphase2:1,cad
ecseq,deltaC:2,d_cbdec:0,cbdecseq,pwcbdec,drescb;2:GRADIENTS:gt1:4,gzlvl1:0,gt2:4
```

```
,gzlvl2:0,gt3:4,gzlvl3:0,gt4:4,gzlvl4:0,gt5:4,gzlvl5:0,gt6:5,gzlvl6:0,gt7:5,gzlvl
7:0,gt8:4,gzlvl8:0,gt9:6,gzlvl9:0,gt10:6,gzlvl10:0,gt11:6,gzlvl11:0;"
0
dhipwr 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 63
0
dh2pwr 7 1 77 0 1 2 1 0 1 64
1 0
0
dhp 1 1 9 9 9 2 1 8192 0 64
1 40
0
dlowpwr 7 1 32767 0 0 2 1 0 1 64
1 46
0
dhpwrb 1 1 9 9 9 2 1 8192 1 64
1 46
0
dhpwr2 1 1 18 18 18 2 1 8192 1 64
1 61
0
disCmd 2 2 8 0 0 4 1 0 1 64
1 ""
0
dlp 7 1 10 10 10 2 1 8194 0 64
1 10
0
dmm 4 2 4 0 0 2 1 0 1 64
1 "cccc"
9 "c" "f" "g" "m" "p" "r" "u" "w" "x"
dmf2 7 1 100000 1 0 2 1 2 1 64
1 3787
0
dm3 4 2 4 0 0 2 1 0 1 64
1 "n"
4 "a" "n" "s" "y"
dm2 2 2 8 0 0 2 1 0 1 64
1 "nnny"
0
dmf 7 1 11 11 11 2 1 8194 1 64
1 3317
0
dmg 2 2 2 0 0 4 1 3 1 64
1 "ph"
0
dmf3 7 1 2000000 1 0 2 1 2 1 64
1 3317
0
dmg1 2 2 8 0 0 4 1 0 1 64
1 ""
4 "" "av1" "ph1" "pwr1"
dn 2 2 4 0 0 2 1 8 1 64
1 "C13"
0
dmm2 2 2 8 0 0 2 1 0 1 64
1 "cccp"
0
```

```
dmm3 4 2 4 0 0 2 1 0 1 64
1 "c"
9 "c" "f" "g" "m" "p" "r" "u" "w" "x"
dn2 2 2 8 0 0 2 1 8 1 64
1 "N15"
0
fpmult 1 1 1000000000 0 0 3 1 0 0 64
1 1
0
dseq3 2 2 8 0 0 2 1 0 1 64
1 ""
0
dpwrsed 1 1 9 9 9 2 1 8192 1 64
1 50
0
dof_co 5 1 1000000000 -1000000000 0 2 1 0 1 64
1 12333.2983367
0
dof2 5 1 16 16 16 2 1 8202 1 64
1 1671.2
0
dod 3 1 14 14 14 2 1 8194 1 64
1 0.00999999977648
0
dof 5 1 8 8 8 2 1 8202 1 64
1 -5434.8198302
0
dof3 5 1 20 20 20 2 1 8202 1 64
1 0
0
dpwr 7 1 9 9 9 2 1 8194 1 64
1 -16
0
dotflag 2 2 8 0 0 4 1 0 1 64
1 "n"
2 "n" "y"
dp 2 2 1 0 0 2 1 0 1 64
1 "y"
2 "y" "n"
dpwr3 7 1 21 21 21 2 1 8194 1 64
1 -16
0
dpwr2 7 1 18 18 18 2 1 8194 1 64
1 44
0
dpwrf 7 1 4095 0 1 2 1 2 0 64
1 4095
0
dres3 7 1 360 1 0 2 1 0 1 64
1 1
0
dres2 7 1 360 1 0 2 1 0 1 64
1 90
0
dres 7 1 360 1 0 2 1 0 1 64
1 2
0
```

```
dseq 2 2 8 0 0 2 1 0 1 64
1 "garp1"
0
dressed 7 1 32767 0 0 2 1 0 1 64
1 2
0
drescb 7 1 32767 0 0 2 1 0 1 64
1 9
0
dseq2 2 2 8 0 0 2 1 0 1 64
1 "waltz16"
0
fb 7 1 6 6 6 2 1 8203 0 64
1 5000
0
f2180 2 2 8 0 0 2 1 0 1 64
1 "n"
0
exppath 2 2 8 0 0 2 1 0 1 64
1 "/usr2/guest/vnmrsys/exp12/acqfil"
0
exp3D 2 2 8 0 0 2 1 0 1 64
1 "n"
0
dvhpwrb 1 1 9 9 9 2 1 8192 1 64
1 53
0
f1coef 2 2 8 0 0 3 1 1 1 64
1 ""
0
f1180 2 2 8 0 0 2 1 0 1 64
1 "n"
0
fad1 2 2 8 0 0 2 1 0 1 64
1 "y"
0
f2coef 2 2 8 0 0 3 1 1 1 64
1 ""
0
fad2 2 2 8 0 0 2 1 0 1 64
1 "n"
0
flag3d 2 2 8 0 0 2 1 0 1 64
1 "y"
0
file 2 2 6 0 0 2 1 3 1 64
1 "/space/guest/vnmrsys/parlib/hacaconnh_CEST_CA_lek_600"
0
fiddc3d 4 2 4 0 0 3 1 0 1 64
1 "nnn"
0
fidid 2 2 8 0 0 2 1 0 1 64
1 ""
0
filter 7 1 1000000000 0 1 2 1 2 1 64
1 54.0999984741
0
```

```
filtfile 2 2 8 0 0 2 1 0 1 64
1 ""
0
fn1 7 1 524288 64 -2 3 1 1 1 64
1 256
0
fn 7 1 524288 64 -2 3 1 1 1 64
1 16384
0
fmlev 4 2 4 0 0 2 1 0 1 64
1 "n"
0
fnoesy 4 2 4 0 0 2 1 0 1 64
1 "n"
0
fn2 7 1 524288 64 -2 3 1 1 0 64
1 0
0
gt10 3 1 14 14 14 2 1 8192 1 64
1 0.000125
0
gf 1 1 100000 0 0 3 1 1 0 64
1 0.046
0
fscuba 4 2 4 0 0 2 1 0 1 64
1 "n"
0
fpmult2 1 1 1000000000 0 0 3 1 0 0 64
1 0
0
fpmult1 1 1 1000000000 0 0 3 1 0 0 64
1 0
0
fsat 2 2 8 0 0 2 1 0 1 64
1 "n"
0
gain 1 1 60 0 2 2 1 0 1 64
1 24
0
gfs 1 1 1000 -1000 0.001 3 1 1 0 64
1 0.01
0
gf1 1 1 100000 0 0 3 1 1 0 64
1 0.0050210384652
0
gf2 1 1 100000 0 0 3 1 1 0 64
1 0
0
gfs2 1 1 1000 -1000 0.001 3 1 1 0 64
1 0
0
gfs1 1 1 1000 -1000 0.001 3 1 1 0 64
1 0
0
gt1 3 1 14 14 14 2 1 8192 1 64
1 0.0005
0
```

```
gt9 3 1 14 14 14 2 1 8192 1 64
1 0.0004
0
gt5 3 1 14 14 14 2 1 8192 1 64
1 0.0015
0
gt3 3 1 14 14 14 2 1 8192 1 64
1 0.001
0
gt2 3 1 14 14 14 2 1 8192 1 64
1 0.0005
0
gt11 3 1 14 14 14 2 1 8192 1 64
1 0.002
0
gt4 3 1 14 14 14 2 1 8192 1 64
1 0.001
0
gt7 3 1 14 14 14 2 1 8192 1 64
1 0.00125
0
gt6 3 1 14 14 14 2 1 8192 1 64
1 0.0008
0
gt8 3 1 14 14 14 2 1 8192 1 64
1 0.0003
0
gzlvl2 1 1 32768 -32768 1 2 1 0 1 64
1 -8000
0
gzlvl10 1 1 32768 -32768 1 2 1 0 1 64
1 29600
0
gzlvl1 1 1 32768 -32768 1 2 1 0 1 64
1 8000
0
gzlvl11 1 1 32768 -32768 1 2 1 0 1 64
1 20000
0
gzlvl4 1 1 32768 -32768 1 2 1 0 1 64
1 15000
0
gzlvl3 1 1 32768 -32786 1 2 1 0 1 64
1 20000
0
gzlvl5 1 1 32768 -32768 1 2 1 0 1 64
1 20000
0
satfrq 5 1 1000000000 -1000000000 0 2 1 0 1 64
1 -9970
0
presat 3 1 14 14 14 2 1 8192 1 64
1 1.5
0
lsfrq 1 1 9.99999984307e+17 -9.99999984307e+17 0 3 1 0 0 64
1 0
0
```

```
is 1 1 1000000000 1e-06 0 4 1 3 1 64
1 4000
0
in 4 2 1 0 0 2 1 0 1 64
1 "n"
3 "n" "w" "y"
hs 4 2 4 0 0 2 1 0 1 64
1 "nnnn"
2 "n" "y"
ho 1 1 500 -500 0 4 1 1 1 64
1 -22.8636363636
0
gzlvl8 1 1 32768 -32768 1 2 1 0 1 64
1 4000
0
gzlvl7 1 1 32768 -32768 1 2 1 0 1 64
1 30000
0
gzlvl9 1 1 32768 -32768 1 2 1 0 1 64
1 2000
0
homo2 4 2 4 0 0 2 1 0 1 64
1 "n"
2 "n" "y"
homo 2 2 8 0 0 2 1 0 1 64
1 "n"
2 "n" "y"
homo3 4 2 4 0 0 2 1 0 1 64
1 "n"
2 "n" "y"
hzmm 1 1 1000000000 -1000000000 0 4 1 11 1 64
1 8.3671875
0
hst 3 1 0.02 0 2.5e-08 2 1 2 1 64
1 0
0
hscuba 3 1 14 14 14 2 1 8192 1 64
1 0.03
0
il 2 2 1 0 0 2 1 0 1 64
1 "n"
2 "y" "n"
insref 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 0 64
1 1
0
ins2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 100
0
ins 3 1 8190 0 1e-07 4 1 3 1 64
1 100
0
ins2ref 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 0 64
1 1
0
investigator 2 2 8 0 0 2 1 0 1 64
1 ""
0
```

```
intmod 2 2 8 0 0 4 1 0 1 64
1 "off"
3 "off" "partial" "full"
io 1 1 500 -500 0.1 4 1 1 1 64
1 10
0
llfrq 1 1 1000000000 -1000000000 0 4 1 0 0 64
200 6387.48778104 6368.71945259 6356.20723363 6324.92668622 6312.41446725
6299.90224829 6287.39002933 6268.62170088 6243.59726295 6231.08504399
6206.06060606 6168.52394917 6156.01173021 6143.49951124 6130.98729228
6112.21896383 6074.68230694 6049.65786901 6005.86510264 5974.58455523
5955.81622678 5943.30400782 5924.53567937 5899.51124145 5880.742913 5849.46236559
5836.95014663 5824.43792766 5805.66959922 5786.90127077 5768.13294233
5755.62072336 5736.85239492 5724.34017595 5705.57184751 5668.03519062
5643.01075269 5624.24242424 5611.73020528 5592.96187683 5542.91300098
5524.14467253 5480.35190616 5430.3030303 5380.25415445 5348.97360704
5311.43695015 5286.41251222 5261.38807429 5230.10752688 5192.57086999
5142.52199413 5123.75366569 5104.98533724 5061.19257087 4992.37536657
4911.0459433 4854.74095797 4792.17986315 4742.13098729 4710.85043988
4692.08211144 4673.31378299 4617.00879765 4560.70381232 4498.1427175
4473.11827957 4429.3255132 4391.7888563 4366.76441838 4347.99608993 4316.71554252
4279.17888563 4266.66666667 4254.1544477 4235.38611926 4185.3372434 4160.31280547
4135.28836755 4110.26392962 4097.75171065 4085.23949169 4072.72727273
4053.95894428 4041.44672532 4028.93450635 4010.16617791 3997.65395894
3978.8856305 3953.86119257 3941.34897361 3928.83675464 3916.32453568
3897.55620723 3885.04398827 3866.27565982 3853.76344086 3834.99511241
3809.97067449 3772.4340176 3753.66568915 3741.15347019 3728.64125122
3716.12903226 3703.61681329 3684.84848485 3672.33626588 3653.56793744
3634.79960899 3622.28739003 3591.00684262 3572.23851417 3497.16520039
3472.14076246 3459.6285435 3447.11632454 3428.34799609 3409.57966764
3365.78690127 3334.50635386 3284.45747801 3259.43304008 3234.40860215
3203.12805474 3178.10361681 3096.77419355 3021.70087977 2996.67644184
2984.16422287 2971.65200391 2959.13978495 2940.3714565 2927.85923754
2896.57869013 2859.04203324 2846.52981427 2834.01759531 2815.24926686
2783.96871945 2765.20039101 2746.43206256 2727.66373412 2696.38318671
2671.35874878 2652.59042033 2633.82209189 2615.05376344 2602.54154448
2590.02932551 2571.26099707 2546.23655914 2521.21212121 2508.69990225
2496.18768328 2477.41935484 2464.90713587 2452.39491691 2433.62658847
2402.34604106 2389.83382209 2377.32160313 2339.78494624 2327.27272727
2314.76050831 2289.73607038 2277.22385142 2264.71163245 2252.19941349
2233.43108504 2220.91886608 2202.15053763 2189.63831867 2170.86999022
2158.35777126 2127.07722385 2114.56500489 2083.28445748 2070.77223851
2045.74780059 1995.69892473 1983.18670577 1970.6744868 1945.65004888
1926.88172043 1908.11339198 1883.08895406 1864.32062561 1845.55229717
1826.78396872 1814.27174976 1801.75953079 1776.73509286 1745.45454545
1707.91788856 1689.14956012 1670.38123167 1657.86901271 1639.10068426
1614.07624633 1576.53958944
0
lb1 1 1 100000 -100000 0 3 1 1 0 64
1 0.318309992552
0
jxh2 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 94
0
jnh 1 1 10000 80 0 2 1 1024 1 64
1 106
0
```

```
jcc 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 75
0
jxh 7 1 32767 0 0 2 1 0 1 64
1 105
0
lb 1 1 100000 -100000 0 3 1 1 0 64
1 5
0
liamp 1 1 1000000000 0 0 4 1 0 0 64
4 0 0 0 0.577882409096
0
lb2 1 1 100000 -100000 0 3 1 1 0 64
1 0
0
lcpeak_ 7 1 32767 0 0 2 1 0 1 64
1 0
0
lifrq 1 1 1000000000 -1000000000 0 4 1 0 1 64
3 7605.95647194 4829.32416953 0
0
llamp 1 1 1000000000 0 0 4 1 0 0 64
200 -4.59109323856e-05 -5.19088607689e-05 -4.7053432354e-05 -5.81574313401e-05 -
5.19840832567e-05 -5.55371480004e-05 -4.04213315051e-05 -4.98456283822e-05 -
5.58155443287e-05 -5.04925847054e-05 -4.31948683399e-05 -5.39735883649e-05 -
5.19470995641e-05 -5.55918377358e-05 -4.98082154081e-05 -5.87051399634e-05 -
4.52509520983e-05 -6.75681585562e-05 4.89473904963e-07 -5.19699970027e-05 -
2.94218007184e-05 -3.88147345802e-05 -2.91328706226e-05 -6.29609421594e-05 -
5.00809728692e-05 -6.77146163071e-05 -6.38160126982e-05 -7.09096857463e-05 -
3.34689066221e-05 -6.18180274614e-05 -3.68875116692e-05 -4.17151532019e-05 -
2.72881752608e-05 -3.60187077604e-05 2.59389489656e-05 -4.47384954896e-05
2.03496692848e-05 -1.918851558e-05 -5.74051318836e-06 -6.3626881456e-05
9.63949132711e-05 5.21112997376e-05 0.000190337683307 0.000276441918686
9.71672634478e-05 0.000668614346068 0.000352685165126 0.000403929530876
0.000406486156862 0.000400811026338 0.00051202083705 5.90048330196e-05
0.000125369871967 5.6045675592e-05 0.000195721484488 0.000586495501921
0.000226417760132 0.00118924141861 0.000177095877007 0.000210481593967
9.40851459745e-05 5.80478408665e-05 0.000169042716152 0.000324096297845
0.000175537803443 0.000141080963658 3.5752873373e-05 0.00100575061515
0.000578368606512 0.000165094563272 0.000141279699164 0.000137800598168
8.40379016154e-06 1.12530606202e-05 -3.27895440932e-06 3.0927509215e-05 -
1.70599105331e-05 -8.41210021463e-06 -1.44544383147e-05 -2.41435354837e-05 -
1.77835827344e-05 -2.28232893278e-05 -5.13579152539e-06 -2.46367108048e-05 -
2.05777068913e-05 -3.80415003747e-05 -1.38831801451e-05 -2.98057329928e-05 -
2.04013631446e-05 -2.93233988486e-05 -2.68420353677e-05 -3.13568452839e-05 -
2.31144804275e-05 -4.10964639741e-05 -3.03998640447e-05 -3.85603998438e-05 -
3.66430067515e-05 -4.40820549557e-05 -2.92319782602e-05 -5.42339148524e-05 -
3.18336860801e-05 -4.89078920509e-05 -3.16614787153e-05 -4.64371987619e-05 -
3.45756561728e-05 -4.65295161121e-05 -4.06016370107e-05 -4.03111916967e-05 -
4.8075151426e-05 -4.44860561402e-05 -5.76606944378e-05 -4.60191586171e-05 -
7.60144830565e-05 -7.12518813089e-05 -5.99354461883e-05 -7.51645711716e-05 -
3.52802089765e-05 -7.59675676818e-05 -0.000122908910271 -8.37808620417e-05 -
0.000199748479645 -0.000225498559303 -0.000299852254102 -0.00137971213553
0.00225383625366 0.000222106522415 0.000117715862871 7.32263506507e-05
6.25418979325e-05 6.92917164997e-05 4.037241888e-05 5.92764699832e-05
2.83369299723e-05 5.82145476073e-05 4.53001048299e-05 5.0560112868e-05
4.75559500046e-05 5.91506395722e-05 2.9575339795e-05 3.60823432857e-05
```

```
4.28182902397e-05 9.47616263147e-06 2.82924866042e-05 1.44651085066e-05
1.84351465577e-05 2.99323119179e-06 2.02673272724e-05 1.38856275953e-05
2.39230357693e-05 1.01590594568e-05 7.77770492277e-06 1.63948388945e-05
3.4671497815e-06 9.79331070994e-06 -2.66348092737e-06 8.34015736473e-06
1.37623737828e-06 7.18825594959e-06 -1.72181694325e-06 2.76931655208e-06 -
9.34515810513e-06 1.97041913452e-06 -1.55771431309e-06 2.83783629129e-06
7.09729692971e-06 -3.37294500241e-06 8.42990687033e-07 -1.31613546728e-06
2.85011287815e-06 1.95264601643e-06 -2.35224979406e-06 5.34264290764e-06
5.38853953458e-07 3.03897081722e-06 -1.1234566955e-05 4.07221705245e-07
2.5734088922e-05 1.53106557264e-05 5.71191558265e-05 -1.89281618077e-05 -
1.01514087874e-05 -1.1526902199e-05 1.56137411977e-06 -9.10408743948e-06 -
1.6485046217e-06 -1.38697050716e-05 -1.64660582413e-06 -1.30044963953e-05 -
9.72137331701e-06 -1.18258340081e-05 -1.10163100544e-05 -2.02856863325e-05 -
1.28133751787e-06 -1.83538886631e-05 -3.99468035539e-06 -1.01575587905e-05 -
9.91281649476e-06 -1.19286560221e-05 -8.64937078404e-07 -1.60061954375e-05
0
lp1 1 1 3600 -3600 0.1 4 1 3 1 64
1 0
0
lockgain_ 1 1 48 0 1 2 1 16 1 64
1 39
0
loc_ 7 1 12 12 12 2 1 8201 0 64
1 0
0
load 2 2 4 0 0 2 1 3 1 64
1 "n"
2 "y" "n"
lockfreq_ 5 1 160 0 1e-07 2 1 9 1 64
1 76.6369
0
lockpower_ 1 1 68 0 1 2 1 16 1 64
1 34
0
lockphase_ 1 1 360 0 1 2 1 16 1 64
1 341
0
lp 1 1 3600 -3600 0.1 4 1 3 1 64
1 0
0
lsfid 7 1 64000 -64000 1 3 1 0 0 64
1 0
0
lp2 1 1 3600 -3600 0.1 4 1 3 1 64
1 0
0
lsfid2 7 1 64000 -64000 1 3 1 0 0 64
1 0
0
osfilt 2 2 8 0 0 2 1 0 1 64
1 "a"
5 "a" "A" "b" "B" ""
ni 7 1 32767 0 0 2 1 0 1 64
1 1
0
method 2 2 6 0 0 2 1 3 1 64
1 "/vnmr/shimmethods/z1z2"
```

```
0
lvl 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 0.00765288227886
0
lsfrq2 1 1 9.99999984307e+17 -9.99999984307e+17 0 3 1 0 0 64
1 0
0
lsfrq1 1 1 9.99999984307e+17 -9.99999984307e+17 0 3 1 0 0 64
1 0
0
math 2 2 1 0 0 3 1 3 1 64
1 "f"
3 "d" "f" "i"
macro 2 2 6 0 0 4 1 3 1 64
1 ""
0
mcyc 7 1 32767 0 0 2 1 0 1 64
1 1
0
mlevpwr 7 1 32767 0 0 2 1 0 1 64
1 50
0
mixnoe 3 1 14 14 14 2 1 8192 1 64
1 0.14
0
mixmlev 3 1 14 14 14 2 1 8192 1 64
1 0.02
0
mixshift 3 1 14 14 14 2 1 8192 1 64
1 0
0
n2 2 2 6 0 0 4 1 3 1 64
1 ""
0
n1 2 2 6 0 0 4 1 3 1 64
1 ""
0
n3 2 2 6 0 0 4 1 3 1 64
1 ""
0
nt 7 1 1000000000 1 1 2 1 2 1 64
1 4
0
notebook 2 2 8 0 0 2 1 0 1 64
1 ""
0
ni2 7 1 32767 0 1 2 1 0 1 64
1 1
0
np 7 1 524288 32 2 2 1 11 1 64
1 1152
0
oscoef 7 1 49999 3 2 2 1 1 1 64
1 151
0
ntype3d 4 2 4 0 0 3 1 0 1 64
1 "nn"
```

```
0
omega_sl 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 25
0
osfb 1 1 100000 0 0 2 1 1 0 64
1 0
0
phase 7 1 4 0 1 2 1 0 1 64
1 1
0
pad 3 1 14 14 14 2 1 8194 1 64
1 0
0
oversamp 7 1 68 0 1 2 1 9 1 64
1 20
0
oslsfrq 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 1 0 64
1 0
0
p1 6 1 13 13 13 2 1 8194 1 64
1 0
0
parversion 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 4 1 64
1 5.1
0
paramChanged 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
0
page 2 2 8 0 0 2 1 0 1 64
1 ""
0
parstyle_ 2 2 8 0 0 4 1 0 1 64
1 "ppa"
0
path3d 2 2 8 0 0 4 1 0 1 64
1 "/usr2/guest/vnmrsys/exp9/datadir3d"
0
phfid1 1 1 3600 -3600 0.1 3 1 0 0 64
1 0
0
phfid 1 1 3600 -3600 0.1 3 1 0 0 64
1 0
0
phase2 7 1 4 0 1 2 1 0 1 64
1 1
0
pltmod 2 2 8 0 0 4 1 0 1 64
1 "off"
5 "off" "fixed" "full" "variable" "user"
pkpick_ 2 2 8 0 0 4 1 0 1 64
1 ""
0
phfid2 1 1 3600 -3600 0.1 3 1 0 0 64
1 0
0
plane 2 2 8 0 0 4 1 0 1 64
1 "f1f3"
```

```
6 "f1f3" "f3f1" "f2f3" "f3f2" "f1f2" "f2f1"
pmode 2 2 8 0 0 3 1 0 1 64
1 "partial"
0
preacq 6 1 13 13 13 2 1 8192 0 64
1 0
0
r3 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 99.3962666667
0
pw90 6 1 13 13 13 2 1 8194 1 64
1 8.2
0
pslabel 2 2 8 0 0 2 1 11 1 64
1 "hacaconnh_CEST_CA_lek_600"
0
proc1 2 2 10 0 0 3 2 1 1 64
1 "ft"
0
probe_ 2 2 8 0 0 2 1 8 1 64
1 ""
0
priority 7 1 32768 0 1 2 1 0 1 64
1 5
0
proc 2 2 10 0 0 3 1 1 1 64
1 "ft"
0
procdim 7 1 1000000000 -1000000000 0 3 1 0 1 64
1 0
0
proc2 2 2 8 0 0 3 1 1 1 64
1 "ft"
0
processid 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
0
purge_flg 2 2 8 0 0 2 1 0 1 64
1 "n"
0
ptspec3d 4 2 4 0 0 3 1 0 1 64
1 "nnn"
0
pw 6 1 13 13 13 2 1 8194 1 64
1 5.975
0
pwcadec 6 1 13 13 13 2 1 8192 1 64
1 310
0
pwc180 6 1 13 13 13 2 1 8192 1 64
1 55
0
pw_waltz 6 1 13 13 13 2 1 8192 1 64
1 85.2
0
pwc90 6 1 13 13 13 2 1 8192 1 64
1 65.4
```

```
0
pwca 6 1 13 13 13 2 1 8192 1 64
1 50
0
pwn15 6 1 200 0 0.025 2 1 1024 1 64
1 36.5
0
pwmlev 6 1 13 13 13 2 1 8192 1 64
1 38.125
0
pwco_sh 2 2 8 0 0 2 1 0 1 64
1 "herm180_17p6_750"
0
pwcbdec 6 1 13 13 13 2 1 8192 1 64
1 40
0
pwcod 6 1 13 13 13 2 1 8192 1 64
1 234
0
pwn 6 1 13 13 13 2 1 8192 1 64
1 39.2
0
pwx2 6 1 13 13 13 2 1 8192 1 64
1 0
0
pwx1 6 1 13 13 13 2 1 8192 1 64
1 36
0
r1 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 9889.01717099
0
pxcodec 6 1 13 13 13 2 1 8192 1 64
1 0
0
r2 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 0.0013333
0
rfband 4 2 4 0 0 2 1 0 1 64
1 "cccc"
3 "c" "h" "l"
reffrq1 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 499.6974473
0
r7 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 0
0
r5 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 0.032
0
r4 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 0.0182848
0
r6 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 0
0
reffrq 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 499.6974473
```

```
0
ref 5 1 1000000000 -1000000000 0 3 1 0 1 64
1 0
0
refpos1 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 0 64
1 0
0
refpos 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 4.6713637993
0
reffrq2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 499.6974473
0
refsource1 2 2 8 0 0 4 1 0 1 64
1 "sfrq"
0
refpos2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 0 64
1 0
0
refsource2 2 2 8 0 0 4 1 0 1 64
1 "sfrq"
0
rof2 6 1 13 13 13 2 1 8194 1 64
1 2
0
rfp 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 0
0
rfl1 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 3812.42851697
0
rfl 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 458051.2
0
rfl2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0
0
rfp2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0
0
rfp1 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 5404.971
0
rof1 6 1 13 13 13 2 1 8194 1 64
1 0
0
sample 2 2 8 0 0 2 1 0 1 64
1 "lysh2o"
0
rp1 1 1 3600 -3600 0.1 4 1 3 1 64
1 0
0
rp 1 1 3600 -3600 0.1 4 1 3 1 64
1 -178.858620689
0
rp2 1 1 3600 -3600 0.1 4 1 3 1 64
1 0
```

```
0
satflg 2 2 8 0 0 2 1 0 1 64
1 "y"
0
samplename 2 2 8 0 0 2 1 0 1 64
1 ""
0
vtwait 3 1 14 14 14 2 1 8194 1 64
1 180
0
sw1 1 1 5000000 1 -2.5e-08 2 1 0 1 64
1 1
0
sp2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0
0
sf 1 1 8190 0 1e-07 4 1 3 1 64
1 0
0
sbs1 1 1 1000 -1000 0.001 3 1 1 1 64
1 -0.003
0
sb1 1 1 1000 -1000 0.001 3 1 1 1 64
1 -0.005
0
saveglobal_ 2 2 8 0 0 3 1 0 1 64
15 "probe"
"lcpeak"
"loc"
"lockpower"
"lockgain"
"lockphase"
"lockfreq"
"z0"
"lkof"
"vloc"
"vrack"
"vzone"
"vproto"
"pkpick"
"parstyle"
0
satpwr 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 12
0
sb 1 1 1000 -1000 0.001 3 1 0 1 64
1 -0.0319999999999
0
sbs 1 1 1000 -1000 0.001 3 1 1 1 64
1 -0.0319999999999
0
sb2 1 1 1000 -1000 0.001 3 1 1 0 64
1 0
0
scf 1 1 1 0 0 2 1 0 1 64
1 0.45
0
```

```
sc 1 1 1 1 1 4 1 8195 1 64
1 0
0
sbs2 1 1 1000 -1000 0.001 3 1 1 0 64
1 0
0
sc2 1 1 3 3 3 4 1 8195 1 64
1 0
0
seqfil 2 2 8 0 0 2 1 11 1 64
1 "hacaconnh_CEST_CA_lek_600"
0
shape 2 2 8 0 0 2 1 0 1 64
1 "herm180_trc"
0
sf2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0
0
sf1 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0
0
sfrq 1 1 1000000000 0 0 2 1 11 1 64
1 598.8055113
0
solvent 2 2 6 0 0 2 1 11 1 64
1 "d2o"
0
sn 1 1 1e+18 -1e+18 0 3 1 1 1 64
1 0
0
shims 2 2 8 0 0 2 1 0 1 64
1 ""
0
sp1 1 1 1000000000 -1000000000 0 4 1 3 1 64
1 1592.54248303
0
sp 1 1 1000000000 -1000000000 0 4 1 3 1 64
1 -458050.223437
0
spin 1 1 32000000 0 0.1 2 1 0 0 64
1 0
0
spco90b 2 2 8 0 0 2 1 0 1 64
1 "hard90co_118p"
0
spco180a 2 2 8 0 0 2 1 0 1 64
1 "hard_118p_sa"
0
spca180b 2 2 8 0 0 2 1 0 1 64
1 "hard_-118p_sa"
0
spco180b 2 2 8 0 0 2 1 0 1 64
1 "hard_-118p_sa"
0
sphase1 1 1 360 0 0.5 2 1 0 1 64
1 0
0
```

```
specdc3d 4 2 4 0 0 3 1 0 1 64
1 "nnn"
0
sphase2 1 1 360 0 0.5 2 1 0 1 64
5 43 44 45 46 47
0
ssntaps 7 1 2500 0 1 3 1 0 1 64
1 121
0
ssfilter 1 1 50000 10 0.1 3 1 0 0 64
1 50
0
ss 7 1 32767 -32768 0 2 1 0 1 64
1 4
0
sslsfrq 1 1 9.99999984307e+17 -9.99999984307e+17 0 3 1 0 0 64
1 0
0
sspul 2 2 8 0 0 2 1 0 1 64
1 "n"
0
ssorder 7 1 20 1 1 3 1 0 0 64
1 7
0
sw 1 1 5 5 5 2 1 8203 1 64
1 9009.00900901
0
tnsat 4 2 4 0 0 2 1 0 1 64
1 "y"
0
time_run 2 2 8 0 0 2 1 0 1 64
1 "20140409T143238"
0
tauf 3 1 14 14 14 2 1 8192 1 64
1 0.0023
0
taub 3 1 14 14 14 2 1 8192 1 64
1 0.0017857125
0
tau_eq 3 1 14 14 14 2 1 8192 1 64
1 0.003
0
sw2 5 1 5000000 1 -2.5e-08 2 1 0 1 64
1 1619.9578811
0
taua 3 1 14 14 14 2 1 8192 1 64
1 0.00179
0
taud 3 1 14 14 14 2 1 8192 1 64
1 0.0124
0
tauc 3 1 14 14 14 2 1 8192 1 64
1 0.004
0
taue 3 1 14 14 14 2 1 8192 1 64
1 0.005
0
```

```
th2d 1 1 1 1e-18 0 4 1 17 1 64
1 0.8
0
th 1 1 1000000000 0 0 4 1 1 1 64
1 59.9850234985
0
temp 1 1 200 -150 0.1 2 1 8 1 64
1 25
0
time_plotted 2 2 8 0 0 3 1 0 1 64
1 ""
0
time_complete 2 2 8 0 0 2 1 0 1 64
1 "20140409T143237"
0
time_processed 2 2 8 0 0 3 1 0 1 64
1 ""
0
time_svfdate 2 2 8 0 0 2 1 0 1 64
1 "20140409T143237"
0
time_submitted 2 2 8 0 0 2 1 0 1 64
1 "20140409T143237"
0
time_sl 3 1 14 14 14 2 1 8192 1 64
1 0.125
0
time_saved 2 2 8 0 0 2 1 0 1 64
1 "20140417T141624"
0
time_sl_max 3 1 14 14 14 2 1 8192 1 64
1 0.125
0
time_submitted_local 2 2 8 0 0 2 1 0 1 64
1 "20140409T143237X02PM% %_"
0
tlt 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 -0.00137997744787
0
tin 2 2 1 0 0 2 1 2 1 64
1 "y"
3 "n" "w" "y"
tn 2 2 4 0 0 2 1 8 1 64
1 "H1"
0
trim 3 1 14 14 14 2 1 8192 1 64
1 0.0005
0
tpwrf 7 1 4095 0 1 2 1 2 0 64
1 4095
0
tpwr 7 1 17 17 17 2 1 8194 1 64
1 63
0
tof 5 1 7 7 7 2 1 8202 1 64
1 -1571.2
0
```

```
tpwr_waltz 1 1 17 17 17 2 1 8192 1 64
1 40
0
tpwrml 1 1 17 17 17 2 1 8192 1 64
1 47
0
trace 2 2 2 0 0 4 1 3 1 64
1 "f1"
3 "f1" "f2" "f3"
vpfi 1 1 500 -500 0 4 1 0 1 64
1 0
0
vo 1 1 500 -500 0 4 1 1 1 64
1 0
0
vf 1 1 1000000000 0 0 4 1 3 1 64
1 3646.45324749
0
tsatpwr 1 1 17 17 17 2 1 8192 1 64
1 0
0
vloc_ 2 2 8 0 0 2 1 8 1 64
1 "A0"
0
vp 7 1 500 -500 0.1 4 1 3 1 64
1 10
0
vpf 1 1 500 -500 0 4 1 0 1 64
1 16.1448614824
0
vs2d 1 1 1000000000 1e-06 0 4 1 3 1 64
1 28523.5943653
0
vrack_ 7 1 5 1 0 2 1 0 1 64
1 1
0
vproto_ 2 2 8 0 0 2 1 0 1 64
1 ""
0
vs 1 1 1000000000 1e-06 0 4 1 3 1 64
1 1298734.13127
0
vsproj 1 1 1000000000 1e-06 0 4 1 3 1 64
1 28523.5943653
0
vtc 1 1 255 0 1 2 1 2 1 64
1 0
0
y4 7 1 19 19 19 2 1 8192 1 64
1 -1554
0
wp2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 1349.98312521
0
wf 1 1 8190 0 1e-07 4 1 3 1 64
1 0.064
0
```

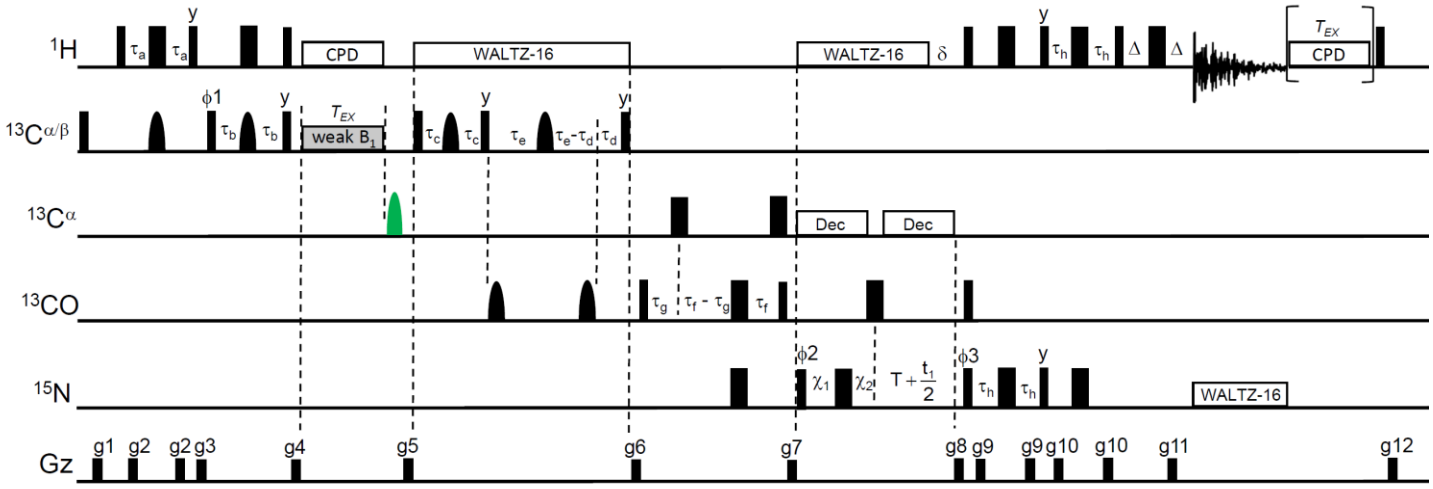
```
wc2 1 1 4 4 4 4 1 8195 1 64
1 130
0
wbs 2 2 6 0 0 3 1 3 1 64
1 ""
0
vzone_ 7 1 15 1 0 2 1 0 1 64
1 1
0
wc 1 1 2 2 2 4 1 8203 1 64
1 250
0
werr 2 2 6 0 0 3 1 3 1 64
1 ""
0
wdone 2 2 8 0 0 3 1 0 1 64
1 "acqdone"
0
wexp 2 2 6 0 0 3 1 3 1 64
1 "svf('pcnohmqc1120')"
0
wnt 2 2 6 0 0 3 1 3 1 64
1 ""
0
wf2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0
0
wf1 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 128
0
wp1 1 1 100000 0 0 4 1 3 1 64
1 1
0
wp 1 1 5000000 0 0 4 1 11 1 64
1 7999.0234375
0
x4 7 1 19 19 19 2 1 8192 1 64
1 -4086
0
wtfile2 2 2 8 0 0 3 1 1 1 64
1 ""
0
wtfile 2 2 15 0 0 3 1 1 1 64
1 ""
0
wshim 4 2 4 0 0 2 1 1 1 64
1 "n"
15 "e" "f" "g" "n" "s" "0" "1" "2" "3" "4" "5" "6" "7" "8" "9"
wtfile1 2 2 15 0 0 3 2 1 1 64
1 ""
0
x2y2 7 1 19 19 19 2 1 8192 1 64
1 -3095
0
x1 7 1 19 19 19 2 1 8192 1 64
1 -1542
0
```

```
x3 7 1 19 19 19 2 1 8192 1 64
1 7390
0
xz2 7 1 19 19 19 2 1 8192 1 64
1 1201
0
xy 7 1 19 19 19 2 1 8192 1 64
1 1648
0
xdiag 1 1 1e+18 0 0 4 1 17 1 64
1 0
0
xz 7 1 19 19 19 2 1 8192 1 64
1 -1243
0
y3 7 1 19 19 19 2 1 8192 1 64
1 3707
0
y1 7 1 19 19 19 2 1 8192 1 64
1 1531
0
z3x 7 1 19 19 19 2 1 8192 1 64
1 4724
0
z2c 7 1 19 19 19 2 1 8192 1 64
1 0
0
z1 7 1 19 19 19 2 1 8192 1 64
1 7310
0
yz2 7 1 19 19 19 2 1 8192 1 64
1 10762
0
yz 7 1 19 19 19 2 1 8192 1 64
1 -2636
0
z0_ 1 1 19 19 19 2 1 8208 1 64
1 -16418
0
z1c 7 1 19 19 19 2 1 8192 1 64
1 0
0
z2 7 1 19 19 19 2 1 8192 1 64
1 -3382
0
z2y3 7 1 19 19 19 2 1 8192 1 64
1 1190
0
z2x3 7 1 19 19 19 2 1 8192 1 64
1 3830
0
z2x2y2 7 1 19 19 19 2 1 8192 1 64
1 -7822
0
z2xy 7 1 19 19 19 2 1 8192 1 64
1 -5085
0
```

```
z3c 7 1 19 19 19 2 1 8192 1 64
1 0
0
z3 7 1 19 19 19 2 1 8192 1 64
1 -2200
0
z5 7 1 19 19 19 2 1 8192 1 64
1 18313
0
z4x 7 1 19 19 19 2 1 8192 1 64
1 749
0
z3y 7 1 19 19 19 2 1 8192 1 64
1 -8758
0
z3x3 7 1 19 19 19 2 1 8192 1 64
1 -444
0
z3x2y2 7 1 19 19 19 2 1 8192 1 64
1 -1296
0
z3xy 7 1 19 19 19 2 1 8192 1 64
1 -2772
0
z4 7 1 19 19 19 2 1 8192 1 64
1 5332
0
z3y3 7 1 19 19 19 2 1 8192 1 64
1 -1994
0
z4c 7 1 19 19 19 2 1 8192 1 64
1 0
0
z4xy 7 1 19 19 19 2 1 8192 1 64
1 884
0
z4x2y2 7 1 19 19 19 2 1 8192 1 64
1 -3010
0
z4y 7 1 19 19 19 2 1 8192 1 64
1 -340
0
z7 7 1 19 19 19 2 1 8192 1 64
1 0
0
z5y 7 1 19 19 19 2 1 8192 1 64
1 5203
0
z5x 7 1 19 19 19 2 1 8192 1 64
1 -2219
0
z6 7 1 19 19 19 2 1 8192 1 64
1 -23672
0
zx2y2 7 1 19 19 19 2 1 8192 1 64
1 267
0
```

```
z8 7 1 19 19 19 2 1 8192 1 64
1 0
0
zxy 7 1 19 19 19 2 1 8192 1 64
1 12681
0
zx3 7 1 19 19 19 2 1 8192 1 64
1 569
0
zy3 7 1 19 19 19 2 1 8192 1 64
1 2296
0
```

# HBCBCACONNH CEST:




```
/*  hbcbcaconnh_CEST_CB_lek_600_v2.c

    This pulse sequence will allow one to perform the following experiment:

    2D cbcaconnh (enhanced sensitivity PFG and with minimal perturbation of
       water) correlating n(i+1), nh(i+1) and getting CEST profiles of the
previous CB

                     F2       N (i+1)
                     F3(acq)  NH (i+1)

    Uses three channels:
    1)  1H              - carrier (tof) @ 4.7ppm [H2O]
    2) 13C              - carrier (dof @ 176ppm [CO] and dofcacb @ 43ppm [CA,CB])
    3) 15N              - carrier (dof2)@ 119ppm [centre of amide N]


    Set dm = 'nnnn', dmm = 'cccc'
    Set dm2 = 'nnny', dmm2 = 'cccp' [15N decoupling during acquisition]
                      dseq2 = 'waltz16'

    Must set phase = 1,2 and phase2 = 1,2 for States-TPPI
    acquisition in t1 [carbon]  and t2 [N]. [The fids must be manipulated
    (add/subtract) with 'grad_sort_nd' program (or equivalent) before regular
    processing.]

    Flags
         fsat     'y' for presaturation of H2O
         fscuba   'y' to apply scuba pulse after presaturation of H2O
         f1180    'y' to get 180deg linear phase correction in F1,
                      otherwise linear phase correction is 0.
         f2180    'y' to get 180deg linear phase correction in F2,
                      otherwise linear phase correction is 0.
```

```
    Standard Settings: fsat='n', fscuba='n', f1180='n', f2180='n'.

    Written by L.E.Kay on Feb. 25, 2014

    Calibration of 13C pulses: Sit at 43 and then jump to 176 ppm Do CEST at
dof_cb

        pwc, dhpwr Set at 63 db
        d_reb, pwc_reb, use reburp pulse centered at 43 ppm (shp_reb) or at 176
ppm as a 176 - 43
            ppm off resonance pulse (shp_rebCO)
        d_co90a, pwc90a
        d_co90b, pwco90b on resonance
        d_co180b, pwco180b on resonance
        d_ca180b, pwca180b off resonance -118ppm, sh_ca180
        cadecseq applied when carrier is on CO, add 6 dB
        d_ib, pwc_ib, used for a 1.5 ms pulse that hits the Ca but not the Cb;
applied with carrier
          at 43 ppm, sh_ib

  Min is a 4 step cycle. Set nt to a multiple of 4
  The first 2 steps of the cycle is when the iburp pulse is either applied or not

  Array taue to get max. Recall taue = 1/(4Jcacb)
      Make sure that there is time for taud = 1/(4*JCaCO)

   At 500 for the iburp2 pulse use:

   RF_I_burp_v2 1800 1000 980 0 0 1 0 > test.RF and then add 1023 in the
resulting file

   Added CEST element

*/

#include <standard.h>

static int  phi1[4]  = {0,0,2,2},
            phi2[8]  = {0,0,0,0,2,2,2,2},
            phi11[1]  = {0},
            rec[8]   = {0,0,2,2,2,2,0,0};

static double d2_init=0.0, d3_init=0.0;

pulsesequence()
{
/* DECLARE VARIABLES */

 char       fsat[MAXSTR],
          fscuba[MAXSTR],
            f1180[MAXSTR],    /* Flag to start t1 @ halfdwell             */
            f2180[MAXSTR],    /* Flag to start t2 @ halfdwell             */
            sh_reb[MAXSTR],
            sh_rebCO[MAXSTR],
            sh_ib[MAXSTR],
            spca180b[MAXSTR],
```

```
            cadecseq[MAXSTR],
            H_heat[MAXSTR];


int         phase, phase2, ni, ni2, icosel,  /* used to get n and p type */
            t1_counter,   /* used for states tppi in t1           */
            t2_counter;   /* used for states tppi in t2           */

double      tau1,         /*  t1 delay */
            tau2,         /*  t2 delay */
            taua,         /*  ~ 1/4JCH =  1.7 ms */
            taub,         /*   1/8JCH =  */
            tauc,         /* ~ 1/4JCACB = 3.6 ms  */
            taud,         /* ~ 1/4JC'CA = 4.3, 4.4 ms */
            taue,         /* ~ 1/4JCACB = 5 - 7 ms */
            taug,         /* = 1/2JC'CO = 5.0 ms    */
            tauf1,         /* 1/4JC'N = 12.4 ms    */
            tauf,         /* 1/4JNH = 2.25 ms */
            BigTN,        /* nitrogen constant time period */

            pwn,          /* PW90 for 15N pulse              */
            pwc,
            pwc_reb,
            pwc_90a,
            pwco90b,
            pwco180b,
            pwca180b,
            pwc_ib,

            tsatpwr,      /* low level 1H trans.power for presat  */
            tpwrml,       /* power level for h decoupling  */
            pwmlev,       /* h 90 pulse at tpwrml            */
            dhpwr,        /* power level for 13C pulses on dec1
                             90 for part a of the sequence at 43 ppm */

            d_co90a,
            d_co90b,
            d_co180b,
            d_ca180b,
            d_ib,
            d_reb,

            dhpwr2,       /* high dec2 pwr for 15N hard pulses    */

            sw1,          /* sweep width in f1                    */
            sw2,          /* sweep width in f2                    */
            dofcacb,      /* dof for dipsi part, 43  ppm            */


            dof_cb,        /* dof for CEST  */
            dof_co,        /* dof at CO  */

            pwcadec,     /* seduce ca decoupling at dpwrsed        */
            dpwrsed,     /* power level for seduce ca decoupling   */
            dressed,     /* resoln for seduce decoupling  = 2      */

            sphase1,     /* phase shift 1  */
```

```
              sphase2,     /* phase shift 2  */

              BigT1,

              deltaC,
              time_sl,

              omega_sl,

              aa_sl, dec_sl, bb_sl, cc_sl,

              tpwr_waltz,
              pw_waltz,

              time_sl_max,

              tau_eq,
              tof_hb,

              gt1,
              gt2,
              gt3,
              gt4,
              gt5,
              gt6,
              gt7,
              gt8,
              gt9,
              gt10,

              gzlvl1,
              gzlvl2,
              gzlvl3,
              gzlvl4,
              gzlvl5,
              gzlvl6,
              gzlvl7,
              gzlvl8,
              gzlvl9,
              gzlvl10;

/* LOAD VARIABLES */

  getstr("fsat",fsat);
  getstr("f1180",f1180);
  getstr("f2180",f2180);
  getstr("fscuba",fscuba);
  getstr("sh_reb",sh_reb);
  getstr("sh_rebCO",sh_rebCO);
  getstr("sh_ib",sh_ib);
  getstr("spca180b",spca180b);
  getstr("cadecseq",cadecseq);

  getstr("H_heat",H_heat);

  taua   = getval("taua");
  taub   = getval("taub");
```

```
tauc   = getval("tauc");
taud   = getval("taud");
taue   = getval("taue");
taug   = getval("taug");
tauf1  = getval("tauf1");
tauf   = getval("tauf");

BigTN  = getval("BigTN");
pwc = getval("pwc");
pwc_reb = getval("pwc_reb");
pwc_90a = getval("pwc_90a");
pwco90b = getval("pwco90b");
pwco180b = getval("pwco180b");
pwca180b = getval("pwca180b");
pwc_ib = getval("pwc_ib");

pwn = getval("pwn");
pwmlev = getval("pwmlev");
tpwr = getval("tpwr");
tsatpwr = getval("tsatpwr");
tpwrml  = getval("tpwrml");
dhpwr = getval("dhpwr");

d_co90a = getval("d_co90a");
d_co90b = getval("d_co90b");
d_co180b = getval("d_co180b");
d_ca180b = getval("d_ca180b");
d_ib = getval("d_ib");
d_reb = getval("d_reb");

dpwr = getval("dpwr");
dhpwr2 = getval("dhpwr2");

phase = (int) ( getval("phase") + 0.5);
phase2 = (int) ( getval("phase2") + 0.5);
sw1 = getval("sw1");
sw2 = getval("sw2");

dofcacb = getval("dofcacb");
dof_cb = getval("dof_cb");
dof_co = getval("dof_co");

ni = getval("ni");
ni2 = getval("ni2");
pwcadec = getval("pwcadec");
dpwrsed = getval("dpwrsed");
dressed = getval("dressed");

BigT1 = getval("BigT1");
sphase1 = getval("sphase1");
sphase2 = getval("sphase2");

tau_eq = getval("tau_eq");
time_sl = getval("time_sl");
deltaC = getval("deltaC");
omega_sl = getval("omega_sl");
```

```
  time_sl_max = getval("time_sl_max");
  tpwr_waltz = getval("tpwr_waltz");
  pw_waltz = getval("pw_waltz");
  tof_hb = getval("tof_hb");


  gt1 = getval("gt1");
  gt2 = getval("gt2");
  gt3 = getval("gt3");
  gt4 = getval("gt4");
  gt5 = getval("gt5");
  gt6 = getval("gt6");
  gt7 = getval("gt7");
  gt8 = getval("gt8");
  gt9 = getval("gt9");
  gt10 = getval("gt10");

  gzlvl1 = getval("gzlvl1");
  gzlvl2 = getval("gzlvl2");
  gzlvl3 = getval("gzlvl3");
  gzlvl4 = getval("gzlvl4");
  gzlvl5 = getval("gzlvl5");
  gzlvl6 = getval("gzlvl6");
  gzlvl7 = getval("gzlvl7");
  gzlvl8 = getval("gzlvl8");
  gzlvl9 = getval("gzlvl9");
  gzlvl10 = getval("gzlvl10");

/* LOAD PHASE TABLE */

  settable(t1,4,phi1);
  settable(t2,8,phi2);
  settable(t11,1,phi11);
  settable(t10,8,rec);

/* CHECK VALIDITY OF PARAMETER RANGES */

    if((dm[A] == 'y' || dm[B] == 'y' || dm[C] == 'y' || dm[D] == 'y' ))
    {
        printf("incorrect dec1 decoupler flags!  ");
        abort(1);
    }

    if((dm2[A] == 'y' || dm2[B] == 'y' || dm2[C] == 'y'))
    {
        printf("incorrect dec2 decoupler flags! Should be 'nnny' ");
        abort(1);
    }

    if( pwmlev < 30.0e-6 )
    {
        printf("too much power during proton mlev sequence\n");
        abort(1);
     }

    if( tpwrml > 53 )
     {
```

```
    printf("tpwrml is too high\n");
    abort(1);
 }

if( tsatpwr > 6 )
{
    printf("TSATPWR too large !!!  ");
    abort(1);
}

if( dpwr > -16 )
{
    printf("don't fry the probe, DPWR too large!  ");
    abort(1);
}

if( dpwr2 > 46 )
{
    printf("don't fry the probe, DPWR2 too large!  ");
    abort(1);
}

if( dhpwr2 > 62 )
{
    printf("don't fry the probe, DHPWR2 too large!  ");
    abort(1);
}

if( pw > 200.0e-6 )
{
    printf("dont fry the probe, pw too high ! ");
    abort(1);
}
if( pwmlev > 200.0e-6 )
{
    printf("dont fry the probe, pwmlev too high ! ");
    abort(1);
}
if( pwn > 200.0e-6 )
{
    printf("dont fry the probe, pwn too high ! ");
    abort(1);
}

if( pwc_reb > 500.0e-6 )
{
    printf("dont fry the probe, pwc_reb too high ! ");
    abort(1);
}

if( pwc_90a > 200.0e-6 )
{
    printf("dont fry the probe, pwc_90a too high ! ");
    abort(1);
}

if( pwco90b > 200.0e-6 )
```

```
{
    printf("dont fry the probe, pwc90b too high ! ");
    abort(1);
}

if( pwco180b > 200.0e-6 )
{
    printf("dont fry the probe, pwco180b too high ! ");
    abort(1);
}


if( pwca180b > 200.0e-6 )
{
    printf("dont fry the probe, pwca180b too high ! ");
    abort(1);
}

if(pwc_ib > 3000e-6) {
     printf("pwc_ib is too long; < 3 ms\n");
     abort(1);
 }

 if(pwc_reb > 500e-6) {
     printf("pwc_reb is too long; < 500 us\n");
     abort(1);
 }

if(d_ib > 50) {
    printf("d_ib is too high; < 51\n");
    abort(1);
}


if( pwcadec > 500.0e-6 || pwcadec < 200.0e-6 )
{
    printf("pwcadec outside reasonable limits: < 500e-6 > 200e-6 \n");
    abort(1);
}

if( dpwrsed > 50 )
{
    printf("dpwrsed is too high\n");
    abort(1);
}

if(time_sl > 0.3) {
  printf("time_sl < 0.3\n");
  abort(1);
}

if(time_sl_max > 0.35) {
  printf("time_sl_max < 0.35\n");
  abort(1);
}

if(tpwr_waltz > 55) {
```

```
      printf("tpwr_waltz is too high; < 56\n");
      abort(1);
    }

    if( gt1 > 5e-3 || gt2 > 5e-3 || gt3 >5e-3 || gt4 > 5e-3 || gt5 > 5e-3 ||
gt6 > 5e-3
          || gt7 > 5e-3 || gt8 > 5e-3 || gt9 > 5e-3 || gt10 > 5e-3)
    {
        printf("all gti values must be < 15e-3\n");
        abort(1);
    }


/*  Phase incrementation for hypercomplex 2D data */

    if (phase == 2) {
     }

    if (phase2 == 2) {
      tsadd(t11,2,4);
      icosel = 1;
    }
    else icosel = -1;

/*  Set up f1180  tau1 = t1               */

    tau1 = d2;
    if(f1180[A] == 'y') {
        tau1 += ( 1.0 / (2.0*sw1) );
        if(tau1 < 0.2e-6) tau1 = 0.0;
    }
        tau1 = tau1/2.0;

/*  Set up f2180  tau2 = t2               */

    tau2 = d3;
    if(f2180[A] == 'y') {
        tau2 += ( 1.0 / (2.0*sw2) );
        if(tau2 < 0.2e-6) tau2 = 0.0;
    }
        tau2 = tau2/2.0;

/* Calculate modifications to phases for States-TPPI acquisition          */

   if( ix == 1) d2_init = d2 ;
   t1_counter = (int) ( (d2-d2_init)*sw1 + 0.5 );
   if(t1_counter % 2) {
    }

   if( ix == 1) d3_init = d3 ;
   t2_counter = (int) ( (d3-d3_init)*sw2 + 0.5 );
   if(t2_counter % 2) {
      tsadd(t2,2,4);
      tsadd(t10,2,4);
    }

/* adjust 13C sl powers  */
```

```
aa_sl = d_co90b + 20.0*log10(omega_sl/(1.0/(4.0*pwco90b))) + 6.0;
dec_sl = floor(aa_sl);
bb_sl = -1.0*(dec_sl - (aa_sl - 6.0));

cc_sl = pow(10,bb_sl/20.0)*4095.0;

/* BEGIN ACTUAL PULSE SEQUENCE */

status(A);
   decoffset(dofcacb);       /* initially pulse at 43 ppm */
   decpower(dhpwr);        /* Set Dec1 power for hard 13C pulses         */
   dec2power(dhpwr2);      /* Set Dec2 power for 15N hard pulses         */

   if(H_heat[A] == 'y') {

    obspower(tpwr_waltz);

    if(deltaC <= -10000) {
        obsunblank();
        obsprgon("CP9024090",pw_waltz,30.0);
        xmtron();
        delay(time_sl_max);
        xmtroff();
        obsprgoff();
        obsblank();
      }

      else if(time_sl_max - time_sl >= 0.2e-6) {
        obsunblank();
        obsprgon("CP9024090",pw_waltz,30.0);
        xmtron();
        delay(time_sl_max - time_sl);
        xmtroff();
        obsprgoff();
        obsblank();
      }

    }

/* now ensure that there is no 1H mag left */

    obspower(tpwr);
    rgpulse(pw,zero,4.0e-6,0.0);

   delay(2.0e-6);
   rgradient('z',gzlvl1);
   delay(gt1*2.0);
   rgradient('z',0.0);
   delay(250.0e-6);

/* Presaturation Period */

status(B);
   if (fsat[A] == 'y')
   {
        obspower(tsatpwr);      /* Set transmitter power for 1H presaturation */
     delay(2.0e-5);
```

```
        rgpulse(d1,zero,rof1,rof1);
      obspower(tpwr);      /* Set transmitter power for hard 1H pulses */
      delay(2.0e-5);
      if(fscuba[A] == 'y')
      {
            delay(2.2e-2);
            rgpulse(pw,zero,2.0e-6,0.0);
            rgpulse(2*pw,one,2.0e-6,0.0);
            rgpulse(pw,zero,2.0e-6,0.0);
            delay(2.2e-2);
      }
   }
   else
   obspower(tpwr);           /* Set transmitter power for hard 1H pulses */
   delay(d1);
   txphase(zero);
   delay(1.0e-5);

/* Begin Pulses */

status(C);

/* Prepare for iburp2 pulse in alternate scans */

   mod2(ct,v1);

   rcvroff();
   delay(20.0e-6);


/* ensure that magnetization originates on H and not 13C  */
   decrgpulse(pwc,zero,0.0,0.0);

   delay(0.2e-6);
   rgradient('z',gzlvl1);
   delay(gt1);
   rgradient('z',0.0);
   delay(250.0e-6);

   rgpulse(pw,zero,0.0,0.0);                    /* 90 deg 1H pulse */

   delay(0.2e-6);
   rgradient('z',gzlvl2);
   delay(gt2);
   rgradient('z',0.0);
   delay(150.0e-6);

   decpower(d_reb);

   delay(taua - gt2 - 150.2e-6 - POWER_DELAY - WFG2_START_DELAY - 0.5*pwc_reb);

   simshaped_pulse("hard",sh_reb,2.0*pw,pwc_reb,zero,zero,0.0,0.0);
   txphase(one);

   delay(0.2e-6);
   rgradient('z',gzlvl2);
   delay(gt2);
```

```
rgradient('z',0.0);
delay(150.0e-6);

delay(taua - 0.5*pwc_reb - WFG2_STOP_DELAY - gt2 - 152.2e-6);

rgpulse(pw,one,0.0,0.0);

delay(0.2e-6);
rgradient('z',gzlvl3);
delay(gt3);
rgradient('z',0.0);
delay(250.0e-6);

decpower(d_co90a);
decrgpulse(pwc_90a,t1,2.0e-6,0.0);

decpower(d_reb);

delay(taub - POWER_DELAY - WFG2_START_DELAY - 0.5*pwc_reb);

/* adjust phase */
initval(1.0,v3);
decstepsize(sphase1);
dcplrphase(v3);
/* adjust phase */

simshaped_pulse("hard",sh_reb,2.0*pw,pwc_reb,zero,zero,0.0,0.0);
dcplrphase(zero);

delay(taub - 0.5*pwc_reb - WFG2_STOP_DELAY - POWER_DELAY - 2.0e-6);

decpower(d_co90a);
decrgpulse(pwc_90a,one,2.0e-6,0.0);

rgpulse(pw,zero,2.0e-6,0.0);

delay(0.2e-6);
rgradient('z',gzlvl4);
delay(gt4);
rgradient('z',0.0);
delay(250.0e-6);

/* NOW do the CEST */

delay(tau_eq);

  decpower(dec_sl); decpwrf(cc_sl); decphase(zero);
  obspower(tpwr_waltz);

  obsoffset(tof_hb);
  decoffset(dof_cb + deltaC);

  delay(2.0e-6);

    if(time_sl > 0.2e-6 && deltaC > -10000) {
     obsprgon("CP9024090",pw_waltz,30.0);
     xmtron();
```

```
        if(omega_sl > 0.0);
          decon();

          delay(time_sl);
          xmtroff();
          obsprgoff();

         if(omega_sl > 0.0)
          decoff();
       }

     decpwrf(4095.0);
     decoffset(dofcacb);
     obsoffset(tof);

   delay(tau_eq);

   /* End of CEST */

   delay(5.0e-6);

/* iburp in alternate scans */
  ifzero(v1);
   decpower(d_ib);
   decshaped_pulse(sh_ib,pwc_ib,zero,2.0e-6,0.0);
  elsenz(v1);
   delay(POWER_DELAY + 2.0e-6 + WFG_START_DELAY + pwc_ib + WFG_STOP_DELAY);
  endif(v1);
/* iburp in alternate scans */

   delay(0.2e-6);
   rgradient('z',gzlvl5);
   delay(gt5);
   rgradient('z',0.0);
   delay(250.0e-6);

   /* H decoupling on */
   obspower(tpwrml);
   obsprgon("waltz16",pwmlev,90.0);
   xmtron();    /* TURN ME OFF  DONT FORGET  */
   /* H decoupling on */

   decpower(d_co90a);
   decrgpulse(pwc_90a,zero,2.0e-6,0.0);

   /* adjust phase */
   initval(1.0,v4);
   decstepsize(sphase1);
   dcplrphase(v4);
   /* adjust phase */

   decpower(d_reb);
   delay(tauc - POWER_DELAY - WFG_START_DELAY);

   decshaped_pulse(sh_reb,pwc_reb,zero,0.0,0.0);
   dcplrphase(zero);
```

```
   decpower(d_co90a);

   delay(tauc - WFG_STOP_DELAY - POWER_DELAY - 2.0e-6);

   decrgpulse(pwc_90a,one,2.0e-6,0.0);
   decphase(zero);

   decpower(d_reb);
   decshaped_pulse(sh_rebCO,pwc_reb,zero,2.0e-6,0.0); /* BS pulse */

   delay(taue - POWER_DELAY - 2.0e-6 - WFG_START_DELAY - pwc_reb - WFG_STOP_DELAY
      - 2.0e-6 - WFG_START_DELAY);

   /* adjust phase */
   initval(1.0,v5);
   decstepsize(sphase2);
   dcplrphase(v5);
   /* adjust phase */

   decshaped_pulse(sh_reb,pwc_reb,zero,2.0e-6,0.0);
   dcplrphase(zero);

   delay(taue - taud - WFG_STOP_DELAY - WFG_START_DELAY - pwc_reb -
WFG_STOP_DELAY);

   decshaped_pulse(sh_rebCO,pwc_reb,zero,0.0,0.0);

   delay(taud - POWER_DELAY - 2.0e-6);

   decpower(d_co90a);
   decrgpulse(pwc_90a,one,2.0e-6,0.0);

   /* H decoupling off */
   xmtroff();
   obsprgoff();
   /* H decoupling off */

   delay(0.2e-6);
   rgradient('z',gzlvl6/2.0);
   delay(gt6);
   rgradient('z',0.0);
   delay(250.0e-6);

   decoffset(dof_co);

   decpower(d_co90b);
   decrgpulse(pwco90b,zero,2.0e-6,0.0);

   delay(taug - POWER_DELAY - 2.0e-6 - WFG_START_DELAY - pwca180b -
WFG_STOP_DELAY);

   decpower(d_ca180b);
   decshaped_pulse(spca180b,pwca180b,zero,2.0e-6,0.0);

   delay(tauf1 - taug - POWER_DELAY - 2.0e-6);

   decpower(d_co180b);
```

```
decrgpulse(pwco180b,zero,2.0e-6,0.0);
dec2rgpulse(2.0*pwn,zero,2.0e-6,0.0);

delay(tauf1 - 2.0e-6 - 2.0*pwn - POWER_DELAY - 2.0e-6
         - WFG_START_DELAY - pwca180b - WFG_STOP_DELAY - 2.0e-6
         - POWER_DELAY - 2.0e-6);

decpower(d_ca180b);
decshaped_pulse(spca180b,pwca180b,zero,2.0e-6,2.0e-6);

decpower(d_co90b);
decrgpulse(pwco90b,zero,2.0e-6,0.0);

delay(0.2e-6);
rgradient('z',gzlvl6);
delay(gt6);
rgradient('z',0.0);
delay(250.0e-6);

obspower(tpwrml);
txphase(zero);
delay(2.0e-6);

/* H decoupling on */
obsprgon("waltz16",pwmlev,90.0);
xmtron();
/* H decoupling on */

/* CA dec on */
decpower(dpwrsed);
decprgon(cadecseq,pwcadec,dressed);
decon();
/* CA dec on */

dec2rgpulse(pwn,t2,2.0e-6,0.0);
dec2phase(zero); decphase(zero);

if(BigTN - tau2 >= 0.2e-6)  {

   delay(BigTN - tau2);

   /* CA DEC off */
   decoff();
   decprgoff();
   /* CA DEC off */

   dec2rgpulse(2*pwn,zero,0.0,0.0);
   decpower(d_co180b);
   decrgpulse(pwco180b,zero,4.0e-6,2.0e-6);

/* CA dec on */
decpower(dpwrsed);
decprgon(cadecseq,pwcadec,dressed);
decon();
/* CA dec on */

  delay(BigTN + tau2
```

```
     - POWER_DELAY - 4.0e-6
     - pwco180b - 2.0e-6
     - 5.5e-3
     + PRG_STOP_DELAY - POWER_DELAY - PRG_START_DELAY);

  dec2phase(t11);

/* H decoupling off */
xmtroff();
obsprgoff();
/* H decoupling off */

obspower(tpwr);

delay(5.5e-3 - PRG_STOP_DELAY
      - POWER_DELAY - 0.2e-6 - gt7 - 1000e-6
      - 2.0*GRADIENT_DELAY - PRG_STOP_DELAY);

   /* CA DEC off */
   decoff();
   decprgoff();
   /* CA DEC off */

}

else {

   dec2rgpulse(2*pwn,zero,2.0e-6,2.0e-6);

   delay(tau2 - BigTN);

   /* CA DEC off */
   decoff();
   decprgoff();
   /* CA DEC off */

   decpower(d_co180b);
   decrgpulse(pwco180b,zero,4.0e-6,2.0e-6);

/* CA dec on */
decpower(dpwrsed);
decprgon(cadecseq,pwcadec,dressed);
decon();
/* CA dec on */

  delay(BigTN + tau2
     - POWER_DELAY - 4.0e-6
     - pwco180b - 2.0e-6
     - 5.5e-3 - PRG_STOP_DELAY - POWER_DELAY - PRG_START_DELAY);

  dec2phase(t11);

/* H decoupling off */
xmtroff();
obsprgoff();
/* H decoupling off */
```

```
obspower(tpwr);

delay(5.5e-3 - PRG_STOP_DELAY
      - POWER_DELAY - 0.2e-6 - gt7 - 1000e-6
      - 2.0*GRADIENT_DELAY - PRG_STOP_DELAY);

   /* CA DEC off */
   decoff();
   decprgoff();
   /* CA DEC off */

}

delay(0.2e-6);
rgradient('z',icosel*gzlvl7);
delay(gt7);
rgradient('z',0.0);
delay(1000.0e-6);

sim3pulse(pw,0.0e-6,pwn,zero,zero,t11,0.0,0.0);

decpower(dhpwr);
decrgpulse(pwc,zero,4.0e-6,0.0);

delay(0.2e-6);
rgradient('z',gzlvl8);
delay(gt8);
rgradient('z',0.0);
delay(2.0e-6);

dec2phase(zero);
delay(tauf - POWER_DELAY - 4.0e-6
           - pwc - gt8 - 2.2e-6);

sim3pulse(2.0*pw,0.0e-6,2.0*pwn,zero,zero,zero,0.0,0.0);

txphase(one);
dec2phase(one);

delay(tauf - gt8 - 200.2e-6);

delay(0.2e-6);
rgradient('z',gzlvl8);
delay(gt8);
rgradient('z',0.0);
delay(200.0e-6);

sim3pulse(pw,0.0e-6,pwn,one,zero,one,0.0,0.0);

delay(0.2e-6);
rgradient('z',gzlvl9);
delay(gt9);
rgradient('z',0.0);
delay(2.0e-6);

txphase(zero);
dec2phase(zero);
```

```
   delay(tauf - gt9 - 2.2e-6 - 0.5*(pwn-pw));

   sim3pulse(2.0*pw,0.0e-6,2.0*pwn,zero,zero,zero,0.0,0.0);

   delay(tauf - gt9 - 200.2e-6);

   delay(0.2e-6);
   rgradient('z',gzlvl9);
   delay(gt9);
   rgradient('z',0.0);
   delay(200.0e-6);

   rgpulse(pw,zero,0.0,0.0);

   delay(BigT1);

   rgpulse(2*pw,zero,0.0,0.0);

   delay(2.0e-6);
   rgradient('z',gzlvl10);
   delay(gt10);
   rgradient('z',0.0);
   delay(100.0e-6);

   delay(BigT1 - gt10 - 2.0*POWER_DELAY - 102.0e-6 - 2.0*GRADIENT_DELAY);

   dec2power(dpwr2);  /* set power for 15N decoupling */
   decpower(dpwr);

/*   rcvron();  */          /* Turn on receiver to warm up before acq */

/* BEGIN ACQUISITION */

status(D);
         setreceiver(t10);

}
```

```
gzlvl6 1 1 32768 -32768 1 2 1 0 1 64
1 -10000
0
dn3 2 2 8 0 0 2 1 8 1 64
1 ""
0
dco90pwr 7 1 32767 0 0 2 1 0 1 64
1 52
0
cr 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 -10232.2108857
0
axisf 4 2 4 0 0 4 1 0 1 64
1 "s"
4 "m" "n" "s" "u"
arraydim 7 1 32768 1 1 2 1 5 1 64
1 96
0
acqstatus 7 1 32767 0 0 2 1 0 1 64
2 12 1
0
acqcycles 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 96
0
BigTN 3 1 14 14 14 2 1 8192 1 64
1 0.0124
0
BigT1 3 1 14 14 14 2 1 8192 1 64
1 0.0005
0
H_heat 2 2 8 0 0 2 1 0 1 64
1 "y"
0
acqdim 7 1 1000000000 -1000000000 0 2 1 0 1 64
1 2
0
alfa 6 1 8192 -8192 1e-07 2 1 8194 1 64
1 6.6
0
aig 2 2 2 0 0 4 1 1 1 64
1 "ai"
2 "nm" "ai"
ap 2 2 1023 0 0 4 1 6 1 64
1 "1:SAMPLE:date,solvent,file;1:3D
ACQUISITION:sw:1,sw1:1,sw2:1,ni:0,ni2:0,phase:0,phase2:0,at:3,np:0,ss:0,nt:0,ct:0
;1:CHANNEL 1:sfrq:3,tn,tof:1,tpwr:0,mlevpwr:0,tsatpwr:0,pw:1,pwmlev:1;1:CHANNEL
2:dfrq:3,dn,dof:1,dpwr:0,dlowpwr:0,pwx1:1,dm,dmm,dmf:0,dseq,homo;2:DELAYS:d1:3,d2
:3,d3:3,hscuba:3,mixnoe:3,mixshift:3,mixmlev:3,trim:3,jxh:1;1:FLAGS:fscuba,fmlev,
fnoesy,dp,hs;2:2D DISPLAY:sp1:1,wp1:1,sc2:0,wc2:0,rfl1:1,rfp1:1;2:DEC. &
VT:dn:2,dof:1,dm,dmm,dmf,dpwr(dpwr):0,pwxlvl:0,pwx:1,dlp(dlp):0,homo,temp(temp):1
,satflg,satdly:3,satfrq:1,satpwr:0;2:PROCESSING:cf(nf):0,lb(lb):2,sb(sb):3,sbs(sb
):3,gf(gf):3,gfs(gf):3,awc(awc):3,lsfid(lsfid):0,phfid(phfid):1,wtfile,proc,fn:0,
math,,werr,wexp,wbs,wnt;2(ni):2D
PROCESSING:lb1(lb1):2,sb1(sb1):3,sbs1(sb1):3,gf1(gf1):3,gfs1(gf1):3,awc1(awc1):3,
wtfile1,proc1,fn1:0;2:DISPLAY:sp:1,wp:1,vs:0,sc:0,wc:0,hzmm:2,is:2,rfl:1,rfp:1,th
:0,ins:3,aig*,dcg*,dmg*;"
0
```

```
alock 2 2 8 0 0 2 1 0 1 64
1 "n"
5 "a" "n" "s" "u" "y"
array 2 2 256 0 0 2 1 1 1 64
1 "phase2"
0
awc 1 1 1 -1 0.001 3 1 1 0 64
1 0
0
arrayelemts 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 2
0
at 1 1 14 14 14 2 1 8203 1 64
1 0.0638896875
0
awc2 1 1 1 -1 0.001 3 1 1 0 64
1 0
0
awc1 1 1 1 -1 0.001 3 1 1 0 64
1 0
0
axis 4 2 4 0 0 4 1 0 1 64
1 "pd"
11 "c" "d" "1" "2" "3" "h" "k" "m" "n" "p" "u"
cofrq 5 1 1000000000 -1000000000 0 2 1 0 1 64
1 10800
0
cadecseq 2 2 8 0 0 2 1 0 1 64
1 "seduce1_118p_sa"
0
c13_de 3 1 14 14 14 2 1 8192 1 64
1 0.001
0
bs 7 1 32767 0 1 2 1 0 1 64
1 16
0
cf 7 1 32767 0 1 3 1 1 0 64
1 1
0
celem 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 84
0
console 2 2 8 0 0 2 1 0 1 64
1 "inova"
0
cp 2 2 1 0 0 2 1 0 1 64
1 "y"
2 "y" "n"
d_co90a 1 1 9 9 9 2 1 8192 1 64
1 50
0
cutoff 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 0 64
1 200
0
crf 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0
0
```

```
cr2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0
0
cr1 1 1 1000000000 -1000000000 0 4 1 3 1 64
1 7653.998132
0
ct 7 1 1000000000 0 1 2 1 6 1 64
1 0
0
d3 3 1 14 14 14 2 1 8194 1 64
1 0
0
d2 3 1 14 14 14 2 1 8194 1 64
1 0
0
d1 3 1 14 14 14 2 1 8194 1 64
1 2
0
d_co180b 1 1 9 9 9 2 1 8192 1 64
1 56
0
d_ca180b 1 1 9 9 9 2 1 8192 1 64
1 56
0
date 2 2 9 0 0 2 1 1 1 64
1 "Feb 27 2014"
0
d_ib 1 1 9 9 9 2 1 8192 1 64
1 47
0
d_co90b 1 1 9 9 9 2 1 8192 1 64
1 49
0
dataProcessed 1 1 9.99999984307e+17 -9.99999984307e+17 0 3 1 0 1 64
1 0
0
d_reb 1 1 9 9 9 2 1 8192 1 64
1 61
0
dataid 2 2 8 0 0 2 1 0 1 64
1 ""
0
dcapwr 7 1 77 0 1 2 1 0 1 64
1 64
0
datname 2 2 8 0 0 3 1 0 1 64
1 ""
0
dcg 2 2 3 0 0 4 1 1 1 64
1 ""
2 "dc" "cdc"
dm 4 2 4 0 0 2 1 0 1 64
1 "nnnn"
4 "a" "n" "s" "y"
dg1 2 2 1023 0 0 4 1 6 1 64
1
"1:DISPLAY:sp:1,wp:1,vs:0;1:REFERENCE:rfl:1,rfp:1,cr:1,delta:1;1:PHASE:lp:1,rp:1,
```

```
rp1(ni):1,lp1(ni):1;2:CHART:sc:0,wc:0,hzmm:2,vp:0,axis,pltmod,,th:0,,ho:2,vo:2,,r
plot,trace:2;3(ni):2D:sp1:1,wp1:1,sc2:0,wc2:0,rfl1:1,rfp1:1;3:FLAGS:aig*,dcg*,dmg
*;3:FID:sf:3,wf:3,vf:0;4:INTEGRAL:intmod,is:2,ins:3,io:0,,lvl:3,tlt:3;"
0
deltafrq 5 1 1000000000 -1000000000 0 2 1 0 1 64
1 -19000
0
delta2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0
0
decfrq 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 -3000
0
dcodpwr 7 1 61 0 0 2 1 0 1 64
1 57
0
deltaf 1 1 100 0 0 4 1 0 1 64
1 0.00296542986425
0
deltaC 5 1 1000000000 -1000000000 0 2 1 0 1 64
1 0
0
dfrq 5 1 1000000000 -1000000000 0 2 1 8 1 64
1 150.5751528
0
deltaone 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
0
dfrq3 1 1 1000000000 0 0 2 1 9 1 64
1 0
0
dfrq2 1 1 1000000000 0 0 2 1 9 1 64
1 60.6833571
0
dg 2 2 1023 0 0 4 1 6 1 64
1 "1:SAMPLE:date;1:3D
ACQUISITION:sw:1,sw1:1,sw2:1,ni:0,ni2:0,phase:0,phase2:0,np:0,ss:0,nt:0,at:3,time
_sl:3,time_sl_max:3,omega_sl:1;2:SPECIAL:gain,temp:1,H_heat,seqfil;2:DELAYS:tau_e
q:4,taua:4,taub:5,tauc:4,taud:4,taue:4,tauf:4,tauf1:4,taug:4,BigTN:4,BigT1:4,d1:3
,d2:6,d3:6,tin,vtwait;3:CHANNEL
1:sfrq:3,tn,tof:1,tof_hb:1,tpwr:0,tpwr_waltz:0,tsatpwr:0,tpwrml:0,pw:2,pw_waltz:1
,pwmlev:2,alfa:1;3:FLAGS:fsat,fscuba,f1180,f2180;4:CHANNEL
3:dfrq2:3,dn2,dof2:1,dhpwr2:0,dpwr2:0,pwn:2,dm2,dmm2,dmf2,dseq2,dres2;"
0
dhpwr 1 1 9 9 9 2 1 8192 1 64
1 63
0
dgs 2 2 1023 0 0 4 1 6 1 64
5 "1:AXIAL SHIMS:z1:0,z2:0,z3:0,z4:0,z5:0,z6:0,z7:0;"
"2:NON AXIAL
SHIMS:x1:0,y1:0,xz:0,yz:0,xy:0,x2y2:0,x3:0,y3:0,xz2:0,yz2:0,zxy:0,zx2y2:0,z3x:0,z
3y:0,z2x2y2:0,z2xy:0;"
"3:NON AXIAL
SHIMS:zx3:0,zy3:0,x4:0,y4:0,z4x:0,z4y:0,z3x2y2:0,z3xy:0,z2x3:0,z2y3:0,z3x3:0,z3y3
:0,z4x2y2:0,z4xy:0,z5x:0,z5y:0;"
"4:AUTOMATION:method,wshim,load,,spin:0,gain:0,alock,loc:0;"
"4:SPECIAL:temp;"
```

```
0
dg2 2 2 1023 0 0 4 1 7 1 64
1 "1:CHANNEL
2:dfrq:3,dn,dof:1,dofcacb:1,dof_co:1,dof_cb:1,dhpwr:0,dpwr:0,dpwrsed,pwc:1,d_co90
a:0,pwc_90a:1,d_co90b:0,pwco90b:1,d_co180b:0,pwco180b:1,d_ca180b:0,pwca180b:1,spc
a180b,d_ib:0,pwc_ib,sh_ib,d_reb:0,pwc_reb:1,sh_reb,sh_rebCO,pwcadec,dseq,dm,dmm,d
res,dressed,dmf,sphase1:1,sphase2:1,cadecseq,deltaC:2;2:GRADIENTS:gt1:4,gzlvl1:0,
gt2:4,gzlvl2:0,gt3:4,gzlvl3:0,gt4:4,gzlvl4:0,gt5:4,gzlvl5:0,gt6:5,gzlvl6:0,gt7:5,
gzlvl7:0,gt8:4,gzlvl8:0,gt9:6,gzlvl9:0,gt10:5,gzlvl10:0;"
0
dhipwr 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 63
0
dh2pwr 7 1 77 0 1 2 1 0 1 64
1 0
0
dhp 1 1 9 9 9 2 1 8192 0 64
1 40
0
dlowpwr 7 1 32767 0 0 2 1 0 1 64
1 46
0
dhpwrb 1 1 9 9 9 2 1 8192 1 64
1 46
0
dhpwr2 1 1 18 18 18 2 1 8192 1 64
1 61
0
disCmd 2 2 8 0 0 4 1 0 1 64
1 ""
0
dlp 7 1 10 10 10 2 1 8194 0 64
1 10
0
dmm 4 2 4 0 0 2 1 0 1 64
1 "cccc"
9 "c" "f" "g" "m" "p" "r" "u" "w" "x"
dmf2 7 1 100000 1 0 2 1 2 1 64
1 3570
0
dm3 4 2 4 0 0 2 1 0 1 64
1 "n"
4 "a" "n" "s" "y"
dm2 2 2 8 0 0 2 1 0 1 64
1 "nnny"
0
dmf 7 1 11 11 11 2 1 8194 1 64
1 3317
0
dmg 2 2 2 0 0 4 1 3 1 64
1 "ph"
0
dmf3 7 1 2000000 1 0 2 1 2 1 64
1 3317
0
dmg1 2 2 8 0 0 4 1 0 1 64
1 ""
```

```
4 "" "av1" "ph1" "pwr1"
dn 2 2 4 0 0 2 1 8 1 64
1 "C13"
0
dmm2 2 2 8 0 0 2 1 0 1 64
1 "cccp"
0
dmm3 4 2 4 0 0 2 1 0 1 64
1 "c"
9 "c" "f" "g" "m" "p" "r" "u" "w" "x"
dn2 2 2 8 0 0 2 1 8 1 64
1 "N15"
0
fpmult 1 1 1000000000 0 0 3 1 0 0 64
1 1
0
dseq3 2 2 8 0 0 2 1 0 1 64
1 ""
0
dpwrsed 1 1 9 9 9 2 1 8192 1 64
1 48
0
dof_co 5 1 1000000000 -1000000000 0 2 1 0 1 64
1 12332.9591929
0
dof2 5 1 16 16 16 2 1 8202 1 64
1 1671
0
dod 3 1 14 14 14 2 1 8194 1 64
1 0.00999999977648
0
dof 5 1 8 8 8 2 1 8202 1 64
1 -7693.52091057
0
dof_cb 5 1 1000000000 -1000000000 0 2 1 0 1 64
1 -8898.13735188
0
dof3 5 1 20 20 20 2 1 8202 1 64
1 0
0
dpwr 7 1 9 9 9 2 1 8194 1 64
1 -16
0
dotflag 2 2 8 0 0 4 1 0 1 64
1 "n"
2 "n" "y"
dofcacb 5 1 1000000000 -1000000000 0 2 1 0 1 64
1 -7693.52091057
0
dp 2 2 1 0 0 2 1 0 1 64
1 "y"
2 "y" "n"
dpwr3 7 1 21 21 21 2 1 8194 1 64
1 -16
0
dpwr2 7 1 18 18 18 2 1 8194 1 64
1 42
```

```
0
dpwrf 7 1 4095 0 1 2 1 2 0 64
1 4095
0
dres3 7 1 360 1 0 2 1 0 1 64
1 1
0
dres2 7 1 360 1 0 2 1 0 1 64
1 90
0
dres 7 1 360 1 0 2 1 0 1 64
1 2
0
dseq 2 2 8 0 0 2 1 0 1 64
1 "garp1"
0
dressed 7 1 32767 0 0 2 1 0 1 64
1 2
0
dseq2 2 2 8 0 0 2 1 0 1 64
1 "waltz16"
0
fb 7 1 6 6 6 2 1 8203 0 64
1 5000
0
f2180 2 2 8 0 0 2 1 0 1 64
1 "n"
0
exppath 2 2 8 0 0 2 1 0 1 64
1 "/space/guest/vnmrsys/exp20/acqfil"
0
exp3D 2 2 8 0 0 2 1 0 1 64
1 "n"
0
dvhpwrb 1 1 9 9 9 2 1 8192 1 64
1 53
0
f1coef 2 2 8 0 0 3 1 1 1 64
1 ""
0
f1180 2 2 8 0 0 2 1 0 1 64
1 "n"
0
fad1 2 2 8 0 0 2 1 0 1 64
1 "y"
0
f2coef 2 2 8 0 0 3 1 1 1 64
1 ""
0
fad2 2 2 8 0 0 2 1 0 1 64
1 "n"
0
flag3d 2 2 8 0 0 2 1 0 1 64
1 "y"
0
file 2 2 6 0 0 2 1 3 1 64
1 "/space/guest/vnmrsys/parlib/hbcbcaconnh_CEST_CB_lek_600_v2"
```

```
0
fiddc3d 4 2 4 0 0 3 1 0 1 64
1 "nnn"
0
fidid 2 2 8 0 0 2 1 0 1 64
1 ""
0
filter 7 1 1000000000 0 1 2 1 2 1 64
1 54.0999984741
0
filtfile 2 2 8 0 0 2 1 0 1 64
1 ""
0
fn1 7 1 524288 64 -2 3 1 1 1 64
1 256
0
fn 7 1 524288 64 -2 3 1 1 1 64
1 16384
0
fmlev 4 2 4 0 0 2 1 0 1 64
1 "n"
0
fnoesy 4 2 4 0 0 2 1 0 1 64
1 "n"
0
fn2 7 1 524288 64 -2 3 1 1 0 64
1 0
0
gt10 3 1 14 14 14 2 1 8192 1 64
1 0.000125
0
gf 1 1 100000 0 0 3 1 1 1 64
1 0.046
0
fscuba 4 2 4 0 0 2 1 0 1 64
1 "n"
0
fpmult2 1 1 1000000000 0 0 3 1 0 0 64
1 0
0
fpmult1 1 1 1000000000 0 0 3 1 0 0 64
1 0
0
fsat 2 2 8 0 0 2 1 0 1 64
1 "n"
0
gain 1 1 60 0 2 2 1 0 1 64
1 24
0
gfs 1 1 1000 -1000 0.001 3 1 1 1 64
1 0.01
0
gf1 1 1 100000 0 0 3 1 1 0 64
1 0.0050210384652
0
gf2 1 1 100000 0 0 3 1 1 0 64
1 0
```

```
0
gfs2 1 1 1000 -1000 0.001 3 1 1 0 64
1 0
0
gfs1 1 1 1000 -1000 0.001 3 1 1 0 64
1 0
0
gt1 3 1 14 14 14 2 1 8192 1 64
1 0.0005
0
gt9 3 1 14 14 14 2 1 8192 1 64
1 0.0004
0
gt5 3 1 14 14 14 2 1 8192 1 64
1 0.0015
0
gt3 3 1 14 14 14 2 1 8192 1 64
1 0.001
0
gt2 3 1 14 14 14 2 1 8192 1 64
1 0.0005
0
gt4 3 1 14 14 14 2 1 8192 1 64
1 0.001
0
gt7 3 1 14 14 14 2 1 8192 1 64
1 0.00125
0
gt6 3 1 14 14 14 2 1 8192 1 64
1 0.0008
0
gt8 3 1 14 14 14 2 1 8192 1 64
1 0.0003
0
gzlvl2 1 1 32768 -32768 1 2 1 0 1 64
1 -8000
0
gzlvl10 1 1 32768 -32768 1 2 1 0 1 64
1 29600
0
gzlvl1 1 1 32768 -32768 1 2 1 0 1 64
1 8000
0
gzlvl4 1 1 32768 -32768 1 2 1 0 1 64
1 15000
0
gzlvl3 1 1 32768 -32786 1 2 1 0 1 64
1 20000
0
gzlvl5 1 1 32768 -32768 1 2 1 0 1 64
1 20000
0
satfrq 5 1 1000000000 -1000000000 0 2 1 0 1 64
1 -9970
0
presat 3 1 14 14 14 2 1 8192 1 64
1 1.5
```

```
0
lsfrq 1 1 9.99999984307e+17 -9.99999984307e+17 0 3 1 0 0 64
1 0
0
is 1 1 1000000000 1e-06 0 4 1 3 1 64
1 4000
0
in 4 2 1 0 0 2 1 0 1 64
1 "n"
3 "n" "w" "y"
hs 4 2 4 0 0 2 1 0 1 64
1 "nnnn"
2 "n" "y"
ho 1 1 500 -500 0 4 1 1 1 64
1 -85.8333333333
0
gzlvl8 1 1 32768 -32768 1 2 1 0 1 64
1 4000
0
gzlvl7 1 1 32768 -32768 1 2 1 0 1 64
1 30000
0
gzlvl9 1 1 32768 -32768 1 2 1 0 1 64
1 -5000
0
homo2 4 2 4 0 0 2 1 0 1 64
1 "n"
2 "n" "y"
homo 2 2 8 0 0 2 1 0 1 64
1 "n"
2 "n" "y"
homo3 4 2 4 0 0 2 1 0 1 64
1 "n"
2 "n" "y"
hzmm 1 1 1000000000 -1000000000 0 4 1 11 1 64
1 10.4792292292
0
hst 3 1 0.02 0 2.5e-08 2 1 2 1 64
1 0
0
hscuba 3 1 14 14 14 2 1 8192 1 64
1 0.03
0
il 2 2 1 0 0 2 1 0 1 64
1 "n"
2 "y" "n"
insref 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 0 64
1 1
0
ins2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 100
0
ins 3 1 8190 0 1e-07 4 1 3 1 64
1 100
0
ins2ref 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 0 64
1 1
```

```
0
investigator 2 2 8 0 0 2 1 0 1 64
1 ""
0
intmod 2 2 8 0 0 4 1 0 1 64
1 "off"
3 "off" "partial" "full"
io 1 1 500 -500 0.1 4 1 1 1 64
1 10
0
llfrq 1 1 1000000000 -1000000000 0 4 1 0 0 64
200 6387.48778104 6368.71945259 6356.20723363 6324.92668622 6312.41446725
6299.90224829 6287.39002933 6268.62170088 6243.59726295 6231.08504399
6206.06060606 6168.52394917 6156.01173021 6143.49951124 6130.98729228
6112.21896383 6074.68230694 6049.65786901 6005.86510264 5974.58455523
5955.81622678 5943.30400782 5924.53567937 5899.51124145 5880.742913 5849.46236559
5836.95014663 5824.43792766 5805.66959922 5786.90127077 5768.13294233
5755.62072336 5736.85239492 5724.34017595 5705.57184751 5668.03519062
5643.01075269 5624.24242424 5611.73020528 5592.96187683 5542.91300098
5524.14467253 5480.35190616 5430.3030303 5380.25415445 5348.97360704
5311.43695015 5286.41251222 5261.38807429 5230.10752688 5192.57086999
5142.52199413 5123.75366569 5104.98533724 5061.19257087 4992.37536657
4911.0459433 4854.74095797 4792.17986315 4742.13098729 4710.85043988
4692.08211144 4673.31378299 4617.00879765 4560.70381232 4498.1427175
4473.11827957 4429.3255132 4391.7888563 4366.76441838 4347.99608993 4316.71554252
4279.17888563 4266.66666667 4254.1544477 4235.38611926 4185.3372434 4160.31280547
4135.28836755 4110.26392962 4097.75171065 4085.23949169 4072.72727273
4053.95894428 4041.44672532 4028.93450635 4010.16617791 3997.65395894
3978.8856305 3953.86119257 3941.34897361 3928.83675464 3916.32453568
3897.55620723 3885.04398827 3866.27565982 3853.76344086 3834.99511241
3809.97067449 3772.4340176 3753.66568915 3741.15347019 3728.64125122
3716.12903226 3703.61681329 3684.84848485 3672.33626588 3653.56793744
3634.79960899 3622.28739003 3591.00684262 3572.23851417 3497.16520039
3472.14076246 3459.6285435 3447.11632454 3428.34799609 3409.57966764
3365.78690127 3334.50635386 3284.45747801 3259.43304008 3234.40860215
3203.12805474 3178.10361681 3096.77419355 3021.70087977 2996.67644184
2984.16422287 2971.65200391 2959.13978495 2940.3714565 2927.85923754
2896.57869013 2859.04203324 2846.52981427 2834.01759531 2815.24926686
2783.96871945 2765.20039101 2746.43206256 2727.66373412 2696.38318671
2671.35874878 2652.59042033 2633.82209189 2615.05376344 2602.54154448
2590.02932551 2571.26099707 2546.23655914 2521.21212121 2508.69990225
2496.18768328 2477.41935484 2464.90713587 2452.39491691 2433.62658847
2402.34604106 2389.83382209 2377.32160313 2339.78494624 2327.27272727
2314.76050831 2289.73607038 2277.22385142 2264.71163245 2252.19941349
2233.43108504 2220.91886608 2202.15053763 2189.63831867 2170.86999022
2158.35777126 2127.07722385 2114.56500489 2083.28445748 2070.77223851
2045.74780059 1995.69892473 1983.18670577 1970.6744868 1945.65004888
1926.88172043 1908.11339198 1883.08895406 1864.32062561 1845.55229717
1826.78396872 1814.27174976 1801.75953079 1776.73509286 1745.45454545
1707.91788856 1689.14956012 1670.38123167 1657.86901271 1639.10068426
1614.07624633 1576.53958944
0
lb1 1 1 100000 -100000 0 3 1 1 0 64
1 0.318309992552
0
jxh2 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 94
```

0
jnh 1 1 10000 80 0 2 1 1024 1 64
1 106
0
jcc 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 75
0
jxh 7 1 32767 0 0 2 1 0 1 64
1 105
0
lb 1 1 100000 -100000 0 3 1 1 0 64
1 5
0
liamp 1 1 1000000000 0 0 4 1 0 0 64
4 0 0 0 0.577882409096
0
lb2 1 1 100000 -100000 0 3 1 1 0 64
1 0
0
lcpeak_ 7 1 32767 0 0 2 1 0 1 64
1 0
0
lifrq 1 1 1000000000 -1000000000 0 4 1 0 1 64
3 7605.95647194 4829.32416953 0
0
llamp 1 1 1000000000 0 0 4 1 0 0 64
200 -4.59109323856e-05 -5.19088607689e-05 -4.7053432354e-05 -5.81574313401e-05 -
5.19840832567e-05 -5.55371480004e-05 -4.04213315051e-05 -4.98456283822e-05 -
5.58155443287e-05 -5.04925847054e-05 -4.31948683399e-05 -5.39735883649e-05 -
5.19470995641e-05 -5.55918377358e-05 -4.98082154081e-05 -5.87051399634e-05 -
4.52509520983e-05 -6.75681585562e-05 4.89473904963e-07 -5.19699970027e-05 -
2.94218007184e-05 -3.88147345802e-05 -2.91328706226e-05 -6.29609421594e-05 -
5.00809728692e-05 -6.77146163071e-05 -6.38160126982e-05 -7.09096857463e-05 -
3.34689066221e-05 -6.18180274614e-05 -3.68875116692e-05 -4.17151532019e-05 -
2.72881752608e-05 -3.60187077604e-05 2.59389489656e-05 -4.47384954896e-05
2.03496692848e-05 -1.918851558e-05 -5.74051318836e-06 -6.3626881456e-05
9.63949132711e-05 5.21112997376e-05 0.000190337683307 0.000276441918686
9.71672634478e-05 0.000668614346068 0.000352685165126 0.000403929530876
0.000406486156862 0.000400811026338 0.00051202083705 5.90048330196e-05
0.000125369871967 5.6045675592e-05 0.000195721484488 0.000586495501921
0.000226417760132 0.00118924141861 0.000177095877007 0.000210481593967
9.40851459745e-05 5.80478408665e-05 0.000169042716152 0.000324096297845
0.000175537803443 0.000141080963658 3.5752873373e-05 0.00100575061515
0.000578368606512 0.000165094563272 0.000141279699164 0.000137800598168
8.40379016154e-06 1.12530606202e-05 -3.27895440932e-06 3.0927509215e-05 -
1.70599105331e-05 -8.41210021463e-06 -1.44544383147e-05 -2.41435354837e-05 -
1.77835827344e-05 -2.28232893278e-05 -5.13579152539e-06 -2.46367108048e-05 -
2.05777068913e-05 -3.80415003747e-05 -1.38831801451e-05 -2.98057329928e-05 -
2.04013631446e-05 -2.93233988486e-05 -2.68420353677e-05 -3.13568452839e-05 -
2.31144804275e-05 -4.10964639741e-05 -3.03998640447e-05 -3.85603998438e-05 -
3.66430067515e-05 -4.40820549557e-05 -2.92319782602e-05 -5.42339148524e-05 -
3.18336860801e-05 -4.89078920509e-05 -3.16614787153e-05 -4.64371987619e-05 -
3.45756561728e-05 -4.65295161121e-05 -4.06016370107e-05 -4.03111916967e-05 -
4.8075151426e-05 -4.44860561402e-05 -5.76606944378e-05 -4.60191586171e-05 -
7.60144830565e-05 -7.12518813089e-05 -5.99354461883e-05 -7.51645711716e-05 -
3.52802089765e-05 -7.59675676818e-05 -0.000122908910271 -8.37808620417e-05 -
0.000199748479645 -0.000225498559303 -0.000299852254102 -0.00137971213553

0.00225383625366 0.000222106522415 0.000117715862871 7.32263506507e-05
6.25418979325e-05 6.92917164997e-05 4.037241888e-05 5.92764699832e-05
2.83369299723e-05 5.82145476073e-05 4.53001048299e-05 5.0560112868e-05
4.75559500046e-05 5.91506395722e-05 2.9575339795e-05 3.60823432857e-05
4.28182902397e-05 9.47616263147e-06 2.82924866042e-05 1.44651085066e-05
1.84351465577e-05 2.99323119179e-06 2.02673272724e-05 1.38856275953e-05
2.39230357693e-05 1.01590594568e-05 7.77770492277e-06 1.63948388945e-05
3.4671497815e-06 9.79331070994e-06 -2.66348092737e-06 8.34015736473e-06
1.37623737828e-06 7.18825594959e-06 -1.72181694325e-06 2.76931655208e-06 -
9.34515810513e-06 1.97041913452e-06 -1.55771431309e-06 2.83783629129e-06
7.09729692971e-06 -3.37294500241e-06 8.42990687033e-07 -1.31613546728e-06
2.85011287815e-06 1.95264601643e-06 -2.35224979406e-06 5.34264290764e-06
5.38853953458e-07 3.03897081722e-06 -1.1234566955e-05 4.07221705245e-07
2.5734088922e-05 1.53106557264e-05 5.71191558265e-05 -1.89281618077e-05 -
1.01514087874e-05 -1.1526902199e-05 1.56137411977e-06 -9.10408743948e-06 -
1.6485046217e-06 -1.38697050716e-05 -1.64660582413e-06 -1.30044963953e-05 -
9.72137331701e-06 -1.18258340081e-05 -1.10163100544e-05 -2.02856863325e-05 -
1.28133751787e-06 -1.83538886631e-05 -3.99468035539e-06 -1.01575587905e-05 -
9.91281649476e-06 -1.19286560221e-05 -8.64937078404e-07 -1.60061954375e-05
0
lp1 1 1 3600 -3600 0.1 4 1 3 1 64
1 0
0
lockgain_ 1 1 48 0 1 2 1 16 1 64
1 39
0
loc_ 7 1 12 12 12 2 1 8201 0 64
1 0
0
load 2 2 4 0 0 2 1 3 1 64
1 "n"
2 "y" "n"
lockfreq_ 5 1 160 0 1e-07 2 1 9 1 64
1 76.7046
0
lockpower_ 1 1 68 0 1 2 1 16 1 64
1 34
0
lockphase_ 1 1 360 0 1 2 1 16 1 64
1 79
0
lp 1 1 3600 -3600 0.1 4 1 3 1 64
1 0
0
lsfid 7 1 64000 -64000 1 3 1 0 0 64
1 0
0
lp2 1 1 3600 -3600 0.1 4 1 3 1 64
1 0
0
lsfid2 7 1 64000 -64000 1 3 1 0 0 64
1 0
0
osfilt 2 2 8 0 0 2 1 0 1 64
1 "a"
5 "a" "A" "b" "B" ""
ni 7 1 32767 0 0 2 1 0 1 64

```
1 1
0
method 2 2 6 0 0 2 1 3 1 64
1 "/vnmr/shimmethods/z1z2"
0
lvl 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 -0.0614836956966
0
lsfrq2 1 1 9.99999984307e+17 -9.99999984307e+17 0 3 1 0 0 64
1 0
0
lsfrq1 1 1 9.99999984307e+17 -9.99999984307e+17 0 3 1 0 0 64
1 0
0
math 2 2 1 0 0 3 1 3 1 64
1 "f"
3 "d" "f" "i"
macro 2 2 6 0 0 4 1 3 1 64
1 ""
0
mcyc 7 1 32767 0 0 2 1 0 1 64
1 1
0
mlevpwr 7 1 32767 0 0 2 1 0 1 64
1 50
0
mixnoe 3 1 14 14 14 2 1 8192 1 64
1 0.14
0
mixmlev 3 1 14 14 14 2 1 8192 1 64
1 0.02
0
mixshift 3 1 14 14 14 2 1 8192 1 64
1 0
0
n2 2 2 6 0 0 4 1 3 1 64
1 ""
0
n1 2 2 6 0 0 4 1 3 1 64
1 ""
0
n3 2 2 6 0 0 4 1 3 1 64
1 ""
0
nt 7 1 1000000000 1 1 2 1 2 1 64
1 32
0
notebook 2 2 8 0 0 2 1 0 1 64
1 ""
0
ni2 7 1 32767 0 1 2 1 0 1 64
1 48
0
np 7 1 524288 32 2 2 1 11 1 64
1 1150
0
oscoef 7 1 49999 3 2 2 1 1 1 64
```

```
1 151
0
ntype3d 4 2 4 0 0 3 1 0 1 64
1 "nn"
0
omega_sl 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 25
0
osfb 1 1 100000 0 0 2 1 1 0 64
1 0
0
phase 7 1 4 0 1 2 1 0 1 64
1 1
0
pad 3 1 14 14 14 2 1 8194 1 64
1 0
0
oversamp 7 1 68 0 1 2 1 9 1 64
1 20
0
oslsfrq 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 1 0 64
1 0
0
p1 6 1 13 13 13 2 1 8194 1 64
1 0
0
parversion 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 4 1 64
1 5.1
0
paramChanged 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
0
page 2 2 8 0 0 2 1 0 1 64
1 ""
0
parstyle_ 2 2 8 0 0 4 1 0 1 64
1 "ppa"
0
path3d 2 2 8 0 0 4 1 0 1 64
1 "/usr2/guest/vnmrsys/exp9/datadir3d"
0
phfid1 1 1 3600 -3600 0.1 3 1 0 0 64
1 0
0
phfid 1 1 3600 -3600 0.1 3 1 0 0 64
1 0
0
phase2 7 1 4 0 1 2 1 0 1 64
2 1 2
0
pltmod 2 2 8 0 0 4 1 0 1 64
1 "off"
5 "off" "fixed" "full" "variable" "user"
pkpick_ 2 2 8 0 0 4 1 0 1 64
1 ""
0
phfid2 1 1 3600 -3600 0.1 3 1 0 0 64
```

```
1 0
0
plane 2 2 8 0 0 4 1 0 1 64
1 "f1f3"
6 "f1f3" "f3f1" "f2f3" "f3f2" "f1f2" "f2f1"
pmode 2 2 8 0 0 3 1 0 1 64
1 "partial"
0
preacq 6 1 13 13 13 2 1 8192 0 64
1 0
0
r3 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 99.3962666667
0
pwc_reb 6 1 13 13 13 2 1 8192 1 64
1 432
0
pslabel 2 2 8 0 0 2 1 11 1 64
1 "hbcbcaconnh_CEST_CB_lek_600_v2"
0
proc 2 2 10 0 0 3 1 1 1 64
1 "ft"
0
priority 7 1 32768 0 1 2 1 0 1 64
1 5
0
probe_ 2 2 8 0 0 2 1 8 1 64
1 ""
0
proc2 2 2 8 0 0 3 1 1 1 64
1 "ft"
0
proc1 2 2 10 0 0 3 2 1 1 64
1 "ft"
0
procdim 7 1 1000000000 -1000000000 0 3 1 0 1 64
1 0
0
processid 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
0
pwc 6 1 13 13 13 2 1 8192 1 64
1 16.1
0
pw 6 1 13 13 13 2 1 8194 1 64
1 6.275
0
ptspec3d 4 2 4 0 0 3 1 0 1 64
1 "nnn"
0
pw90 6 1 13 13 13 2 1 8194 1 64
1 8.2
0
pw_waltz 6 1 13 13 13 2 1 8192 1 64
1 70.75
0
pwc_ib 6 1 13 13 13 2 1 8192 1 64
```

```
1 1804
0
pwc_90a 6 1 13 13 13 2 1 8192 1 64
1 60.5
0
pwmlev 6 1 13 13 13 2 1 8192 1 64
1 39.375
0
pwco180b 6 1 13 13 13 2 1 8192 1 64
1 59
0
pwca180b 6 1 13 13 13 2 1 8192 1 64
1 59
0
pwca 6 1 13 13 13 2 1 8192 1 64
1 50
0
pwcadec 6 1 13 13 13 2 1 8192 1 64
1 320
0
pwco_sh 2 2 8 0 0 2 1 0 1 64
1 "herm180_17p6_750"
0
pwco90b 6 1 13 13 13 2 1 8192 1 64
1 67.2
0
pwcod 6 1 13 13 13 2 1 8192 1 64
1 234
0
pwx2 6 1 13 13 13 2 1 8192 1 64
1 0
0
pwn15 6 1 200 0 0.025 2 1 1024 1 64
1 36.5
0
pwn 6 1 13 13 13 2 1 8192 1 64
1 39
0
pwx1 6 1 13 13 13 2 1 8192 1 64
1 36
0
r1 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 0.0013333
0
pxcodec 6 1 13 13 13 2 1 8192 1 64
1 0
0
r2 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 0.0013333
0
rfband 4 2 4 0 0 2 1 0 1 64
1 "cccc"
3 "c" "h" "l"
reffrq1 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 499.6974473
0
r7 1 1 1e+18 -1e+18 0 4 1 1 1 64
```

```
1 0
0
r5 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 0.032
0
r4 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 0.0182848
0
r6 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 0
0
reffrq 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 499.6974473
0
ref 5 1 1000000000 -1000000000 0 3 1 0 1 64
1 0
0
refpos1 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 0 64
1 0
0
refpos 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 4.6713637993
0
reffrq2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 499.6974473
0
refsource1 2 2 8 0 0 4 1 0 1 64
1 "sfrq"
0
refpos2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 0 64
1 0
0
refsource2 2 2 8 0 0 4 1 0 1 64
1 "sfrq"
0
rof2 6 1 13 13 13 2 1 8194 1 64
1 2
0
rfp 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 0
0
rfl1 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 3812.42851697
0
rfl 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 17022.2040038
0
rfl2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0
0
rfp2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0
0
rfp1 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 5404.971
0
rof1 6 1 13 13 13 2 1 8194 1 64
```

```
1 0
0
sample 2 2 8 0 0 2 1 0 1 64
1 "lysh2o"
0
rp1 1 1 3600 -3600 0.1 4 1 3 1 64
1 0
0
rp 1 1 3600 -3600 0.1 4 1 3 1 64
1 -66.1489361702
0
rp2 1 1 3600 -3600 0.1 4 1 3 1 64
1 0
0
satflg 2 2 8 0 0 2 1 0 1 64
1 "y"
0
samplename 2 2 8 0 0 2 1 0 1 64
1 ""
0
vtwait 3 1 14 14 14 2 1 8194 1 64
1 180
0
sw1 1 1 5000000 1 -2.5e-08 2 1 0 1 64
1 1
0
sp2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0
0
sf 1 1 8190 0 1e-07 4 1 3 1 64
1 0
0
sbs1 1 1 1000 -1000 0.001 3 1 1 1 64
1 -0.003
0
sb1 1 1 1000 -1000 0.001 3 1 1 1 64
1 -0.005
0
saveglobal_ 2 2 8 0 0 3 1 0 1 64
15 "probe"
"lcpeak"
"loc"
"lockpower"
"lockgain"
"lockphase"
"lockfreq"
"z0"
"lkof"
"vloc"
"vrack"
"vzone"
"vproto"
"pkpick"
"parstyle"
0
satpwr 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 12
```

```
0
sb 1 1 1000 -1000 0.001 3 1 0 1 64
1 -0.0319999999999
0
sbs 1 1 1000 -1000 0.001 3 1 1 1 64
1 -0.0319999999999
0
sb2 1 1 1000 -1000 0.001 3 1 1 0 64
1 0
0
scf 1 1 1 0 0 2 1 0 1 64
1 0.45
0
sc 1 1 1 1 1 4 1 8195 1 64
1 6.25
0
sbs2 1 1 1000 -1000 0.001 3 1 1 0 64
1 0
0
sc2 1 1 3 3 3 4 1 8195 1 64
1 0
0
seqfil 2 2 8 0 0 2 1 11 1 64
1 "hbcbcaconnh_CEST_CB_lek_600_v2"
0
shape 2 2 8 0 0 2 1 0 1 64
1 "herm180_trc"
0
sfrq 1 1 1000000000 0 0 2 1 11 1 64
1 598.8055193
0
sf1 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0
0
sf2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0
0
sh_reb 2 2 8 0 0 2 1 0 1 64
1 "reb_432_1023_sa"
0
sh_ib 2 2 8 0 0 2 1 0 1 64
1 "iburp_1800_pad_960_sa_17p"
0
sh_rebCO 2 2 8 0 0 2 1 0 1 64
1 "reb_432_1023_sa_133p"
0
solvent 2 2 6 0 0 2 1 11 1 64
1 "d2o"
0
sn 1 1 1e+18 -1e+18 0 3 1 1 1 64
1 0
0
shims 2 2 8 0 0 2 1 0 1 64
1 ""
0
sp1 1 1 1000000000 -1000000000 0 4 1 3 1 64
1 1592.54248303
```

```
0
sp 1 1 1000000000 -1000000000 0 4 1 3 1 64
1 -12590.0374623
0
spin 1 1 32000000 0 0.1 2 1 0 0 64
1 0
0
spco90b 2 2 8 0 0 2 1 0 1 64
1 "hard90co_118p"
0
spco180a 2 2 8 0 0 2 1 0 1 64
1 "sed180_133p"
0
spca180b 2 2 8 0 0 2 1 0 1 64
1 "hard_-118p_sa"
0
spco180b 2 2 8 0 0 2 1 0 1 64
1 "hard180co_118p"
0
sphase1 1 1 360 0 0.5 2 1 0 1 64
1 0
0
specdc3d 4 2 4 0 0 3 1 0 1 64
1 "nnn"
0
sphase2 1 1 360 0 0.5 2 1 0 1 64
1 0
0
ssntaps 7 1 2500 0 1 3 1 0 1 64
1 121
0
ssfilter 1 1 50000 10 0.1 3 1 0 1 64
1 100
0
ss 7 1 32767 -32768 0 2 1 0 1 64
1 16
0
sslsfrq 1 1 9.99999984307e+17 -9.99999984307e+17 0 3 1 0 0 64
1 0
0
sspul 2 2 8 0 0 2 1 0 1 64
1 "n"
0
ssorder 7 1 20 1 1 3 1 0 0 64
1 7
0
sw 1 1 5 5 5 2 1 8203 1 64
1 9009.00900901
0
tnsat 4 2 4 0 0 2 1 0 1 64
1 "y"
0
time_run 2 2 8 0 0 2 1 0 1 64
1 "20140227T151239"
0
tauf 3 1 14 14 14 2 1 8192 1 64
1 0.0023
```

```
0
taub 3 1 14 14 14 2 1 8192 1 64
1 0.000925925
0
tau_eq 3 1 14 14 14 2 1 8192 1 64
1 0.003
0
sw2 5 1 5000000 1 -2.5e-08 2 1 0 1 64
1 1213.99738991
0
taua 3 1 14 14 14 2 1 8192 1 64
1 0.00179
0
taud 3 1 14 14 14 2 1 8192 1 64
1 0.005
0
tauc 3 1 14 14 14 2 1 8192 1 64
1 0.0036
0
taue 3 1 14 14 14 2 1 8192 1 64
1 0.006
0
th 1 1 1000000000 0 0 4 1 1 1 64
1 59.9850234985
0
taug 3 1 14 14 14 2 1 8192 1 64
1 0.005
0
tauf1 3 1 14 14 14 2 1 8192 1 64
1 0.0124
0
temp 1 1 200 -150 0.1 2 1 8 1 64
1 25
0
time_complete 2 2 8 0 0 2 1 0 1 64
1 "20140227T150523"
0
th2d 1 1 1 1e-18 0 4 1 17 1 64
1 0.8
0
time_processed 2 2 8 0 0 3 1 0 1 64
1 "20140227T161125"
0
time_svfdate 2 2 8 0 0 2 1 0 1 64
1 "20140227T150523"
0
time_submitted 2 2 8 0 0 2 1 0 1 64
1 "20140227T150523"
0
time_sl 3 1 14 14 14 2 1 8192 1 64
1 0.125
0
time_saved 2 2 8 0 0 2 1 0 1 64
1 "20140228T094114"
0
time_sl_max 3 1 14 14 14 2 1 8192 1 64
1 0.125
```

```
0
time_submitted_local 2 2 8 0 0 2 1 0 1 64
1 "20140227T150523X03PM% %_"
0
tlt 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 -0.00345352134445
0
tin 2 2 1 0 0 2 1 2 1 64
1 "y"
3 "n" "w" "y"
tn 2 2 4 0 0 2 1 8 1 64
1 "H1"
0
trim 3 1 14 14 14 2 1 8192 1 64
1 0.0005
0
tpwrf 7 1 4095 0 1 2 1 2 0 64
1 4095
0
tpwr 7 1 17 17 17 2 1 8194 1 64
1 63
0
tof 5 1 7 7 7 2 1 8202 1 64
1 -1563.2
0
tof_hb 5 1 1000000000 -1000000000 0 2 1 0 1 64
1 -2898.53630804
0
tpwr_waltz 1 1 17 17 17 2 1 8192 1 64
1 42
0
tpwrml 1 1 17 17 17 2 1 8192 1 64
1 47
0
trace 2 2 2 0 0 4 1 3 1 64
1 "f1"
3 "f1" "f2" "f3"
vpfi 1 1 500 -500 0 4 1 0 1 64
1 0
0
vo 1 1 500 -500 0 4 1 1 1 64
1 0
0
vf 1 1 1000000000 0 0 4 1 3 1 64
1 29171.6259799
0
tsatpwr 1 1 17 17 17 2 1 8192 1 64
1 0
0
vloc_ 2 2 8 0 0 2 1 8 1 64
1 "A0"
0
vp 7 1 500 -500 0.1 4 1 3 1 64
1 0
0
vpf 1 1 500 -500 0 4 1 0 1 64
1 16.1448614824
```

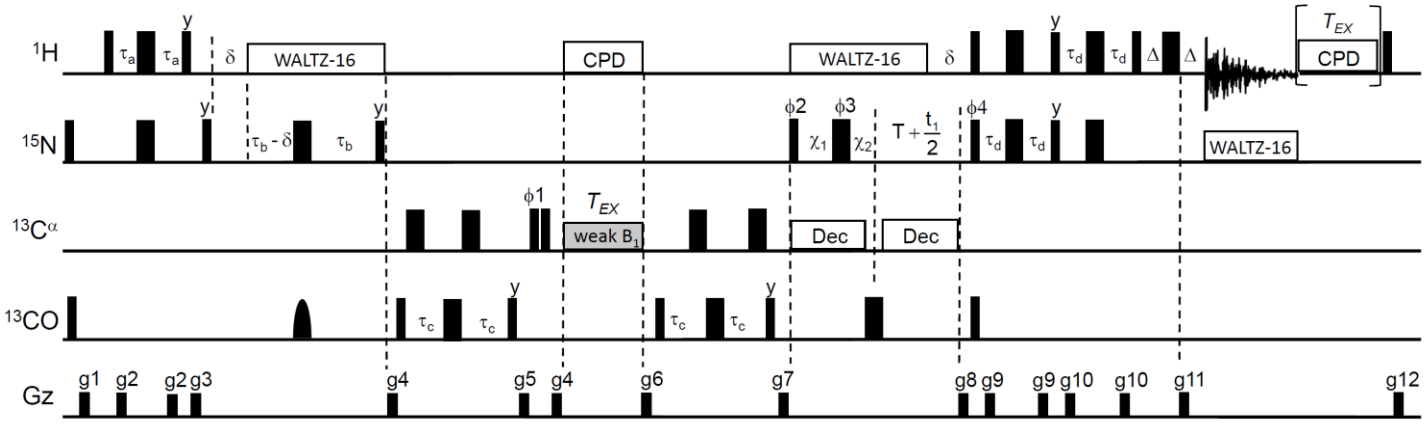
```
0
vs2d 1 1 1000000000 1e-06 0 4 1 3 1 64
1 28523.5943653
0
vrack_ 7 1 5 1 0 2 1 0 1 64
1 1
0
vproto_ 2 2 8 0 0 2 1 0 1 64
1 ""
0
vs 1 1 1000000000 1e-06 0 4 1 3 1 64
1 391013.448181
0
vsproj 1 1 1000000000 1e-06 0 4 1 3 1 64
1 28523.5943653
0
vtc 1 1 255 0 1 2 1 2 1 64
1 0
0
y4 7 1 19 19 19 2 1 8192 1 64
1 -1554
0
wp2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 1349.98312521
0
wf 1 1 8190 0 1e-07 4 1 3 1 64
1 0.063936
0
wc2 1 1 4 4 4 4 1 8195 1 64
1 130
0
wbs 2 2 6 0 0 3 1 3 1 64
1 ""
0
vzone_ 7 1 15 1 0 2 1 0 1 64
1 1
0
wc 1 1 2 2 2 4 1 8203 1 64
1 225
0
werr 2 2 6 0 0 3 1 3 1 64
1 ""
0
wdone 2 2 8 0 0 3 1 0 1 64
1 "acqdone"
0
wexp 2 2 6 0 0 3 1 3 1 64
1 "svf('pcnohmqc1120')"
0
wnt 2 2 6 0 0 3 1 3 1 64
1 ""
0
wf2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0
0
wf1 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 128
```

```
0
wp1 1 1 100000 0 0 4 1 3 1 64
1 1
0
wp 1 1 5000000 0 0 4 1 11 1 64
1 2357.82657658
0
x4 7 1 19 19 19 2 1 8192 1 64
1 -4086
0
wtfile2 2 2 8 0 0 3 1 1 1 64
1 ""
0
wtfile 2 2 15 0 0 3 1 1 1 64
1 ""
0
wshim 4 2 4 0 0 2 1 1 1 64
1 "n"
15 "e" "f" "g" "n" "s" "0" "1" "2" "3" "4" "5" "6" "7" "8" "9"
wtfile1 2 2 15 0 0 3 2 1 1 64
1 ""
0
x2y2 7 1 19 19 19 2 1 8192 1 64
1 -3095
0
x1 7 1 19 19 19 2 1 8192 1 64
1 -1542
0
x3 7 1 19 19 19 2 1 8192 1 64
1 7390
0
xz2 7 1 19 19 19 2 1 8192 1 64
1 1201
0
xy 7 1 19 19 19 2 1 8192 1 64
1 1648
0
xdiag 1 1 1e+18 0 0 4 1 17 1 64
1 0
0
xz 7 1 19 19 19 2 1 8192 1 64
1 -1243
0
y3 7 1 19 19 19 2 1 8192 1 64
1 3707
0
y1 7 1 19 19 19 2 1 8192 1 64
1 1531
0
z3x 7 1 19 19 19 2 1 8192 1 64
1 4724
0
z2c 7 1 19 19 19 2 1 8192 1 64
1 0
0
z1 7 1 19 19 19 2 1 8192 1 64
1 7120
```

0
yz2 7 1 19 19 19 2 1 8192 1 64
1 10762
0
yz 7 1 19 19 19 2 1 8192 1 64
1 -2636
0
z0_ 1 1 19 19 19 2 1 8208 1 64
1 -10714
0
z1c 7 1 19 19 19 2 1 8192 1 64
1 0
0
z2 7 1 19 19 19 2 1 8192 1 64
1 -3429
0
z2y3 7 1 19 19 19 2 1 8192 1 64
1 1190
0
z2x3 7 1 19 19 19 2 1 8192 1 64
1 3830
0
z2x2y2 7 1 19 19 19 2 1 8192 1 64
1 -7822
0
z2xy 7 1 19 19 19 2 1 8192 1 64
1 -5085
0
z3c 7 1 19 19 19 2 1 8192 1 64
1 0
0
z3 7 1 19 19 19 2 1 8192 1 64
1 -2076
0
z5 7 1 19 19 19 2 1 8192 1 64
1 18313
0
z4x 7 1 19 19 19 2 1 8192 1 64
1 749
0
z3y 7 1 19 19 19 2 1 8192 1 64
1 -8758
0
z3x3 7 1 19 19 19 2 1 8192 1 64
1 -444
0
z3x2y2 7 1 19 19 19 2 1 8192 1 64
1 -1296
0
z3xy 7 1 19 19 19 2 1 8192 1 64
1 -2772
0
z4 7 1 19 19 19 2 1 8192 1 64
1 5452
0
z3y3 7 1 19 19 19 2 1 8192 1 64
1 -1994

0
z4c 7 1 19 19 19 2 1 8192 1 64
1 0
0
z4xy 7 1 19 19 19 2 1 8192 1 64
1 884
0
z4x2y2 7 1 19 19 19 2 1 8192 1 64
1 -3010
0
z4y 7 1 19 19 19 2 1 8192 1 64
1 -340
0
z7 7 1 19 19 19 2 1 8192 1 64
1 0
0
z5y 7 1 19 19 19 2 1 8192 1 64
1 5203
0
z5x 7 1 19 19 19 2 1 8192 1 64
1 -2219
0
z6 7 1 19 19 19 2 1 8192 1 64
1 -23672
0
zx2y2 7 1 19 19 19 2 1 8192 1 64
1 267
0
z8 7 1 19 19 19 2 1 8192 1 64
1 0
0
zxy 7 1 19 19 19 2 1 8192 1 64
1 12681
0
zx3 7 1 19 19 19 2 1 8192 1 64
1 569
0
zy3 7 1 19 19 19 2 1 8192 1 64
1 2296
0

# HNCOCA CEST:




```
/*  hncoca_CA_CEST_600_lek.c

    This pulse sequence will allow one to perform the following experiment:

    CO CEST with Ca decoupling using waveform (WURST-8 applied on Ca and
symmetrically
     downfield from CO).

    2D hnco (Hn i+1,N i+1) (enhanced sensitivity PFG)
                        F1       N     (i+1)
                        F2(acq)  NH    (i+1)

    This sequence uses the standard four channel configuration
         1)  1H             - carrier @ 4.7 ppm [H2O]
         2) 13C             - carrier @ 176 ppm (C0)
         3) 15N             - carrier @ 119 ppm

    Standard flag setting
      f2180 = 'n'  for (0,0) phase correction in f2
      fsat = 'n' fscuba = 'n'. don't saturate water
      dm = 'nnnn'
      dm2 = 'nnny' dmm2 = 'cccp'
      dm3 = 'nnnn' dmm3 = 'cccc'

    Setup:

        Set C carrier on C' (176 ppm)
        dhpwr = 63 pwc
        dpwr_cp, power level for pwreb_cp (< 500 us)
          Use the CO_CA selective pulse generated with the program
RF_CO_Ca_burp_v2.c
          a modified re-burp, with extra flat profile.
          This is used for CPMG transfer from N to CO

        d_co90, pwco90 set to delta/sq(15)
```

```
        d_csed, seduce decoupling power; calibrate seduce 90 to about 315 us --
add 6 db since cos mod.


    Total transfer time from N to CO initially:

        5.5ms + 2*bigTN1.

    Modified by LEK on Aug 27, 2012 to include a flag so as to either use the
CPMG transfer at the start
     (CPMG_flg == y) or not. If not then dhpwr2 can be set to 61

    Written on Feb 18, 2014 from hnco_CO_CEST_600_lek_v2.c

*/

#include <standard.h>
#define DELAY_BLANK 0.0e-6
#define max2(x,y) ((x)>(y)?(x):(y))

static int  phi2[2]  = {0,2},
            phi3[1]  = {0},
            phi4[4]  = {0,0,2,2},
            phi5[1]  = {0},
            rec[2]   = {0,2};

static double d2_init=0.0, d3_init=0.0;


pulsesequence()

{

/* DECLARE VARIABLES */

 char       fsat[MAXSTR],
          fscuba[MAXSTR],
            f1180[MAXSTR],    /* Flag to start t1 @ halfdwell             */
            f2180[MAXSTR],    /* Flag to start t2 @ halfdwell             */
            shp_sl1[MAXSTR],
            sh_cpmg[MAXSTR],  /* on -resonance RE-BURP  < 500 us */
            cadecseq[MAXSTR],
            CPMG_flg[MAXSTR],
            spca180[MAXSTR],
            H_heat[MAXSTR];

 int         phase, phase2, ni, ni2, icosel,
             t1_counter,   /* used for states tppi in t1           */
             t2_counter;   /* used for states tppi in t2           */

 double      tau1,         /*  t1 delay */
             tau2,         /*  t2 delay */
             taua,         /*  ~ 1/4JNH =  2.25 ms */
             bigTN,        /* nitrogen T period */
             pwn,          /* PW90 for 15N pulse              */
             tsatpwr,      /* low level 1H trans.power for presat  */
             dhpwr2,       /* high dec2 pwr for 15N hard pulses    */
```

```
sw1,          /* sweep width in f1                    */
sw2,          /* sweep width in f2                    */
BigT1,
tauf,         /* 1/2J NH value                     */

pw_sl1,        /* selective pulse on water      */
tpwrsl1,       /* power for pw_sl               */
phase_sl1,

at,

tpwrml,
pwmlev,

dhpwr,
pwc,

dpwr_cp,
pwreb_cp,

tau_eq,

bigTN1,        /* first nitrogen T period */

d_co90,
pwco90,

d_csed,
dressed,
pwcadec,

deltaC,
time_sl,

omega_sl,     /* weak 13C B1 field */

aa_sl, dec_sl, bb_sl, cc_sl,

dof_ca,

d_ca90,
pwca90,

d_ca180,
pwca180,

d_co180,
pwco180,

tpwr_waltz,
pw_waltz,

time_sl_max,
taub,

sphase1,
```

```
            gt1,
            gt2,
            gt3,
            gt4,
            gt5,
            gt6,
            gt7,
            gt8,
            gt9,
            gt10,
            gt11,

            gzlvl1,
            gzlvl2,
            gzlvl3,
            gzlvl4,
            gzlvl5,
            gzlvl6,
            gzlvl7,
            gzlvl8,
            gzlvl9,
            gzlvl10,
            gzlvl11;

/*  variables commented out are already defined by the system      */

/* LOAD VARIABLES */

  getstr("fsat",fsat);
  getstr("f1180",f1180);
  getstr("f2180",f2180);
  getstr("fscuba",fscuba);
  getstr("shp_sl1",shp_sl1);

  getstr("sh_cpmg",sh_cpmg);

  getstr("cadecseq",cadecseq);

  getstr("CPMG_flg",CPMG_flg);

  getstr("spca180",spca180);
  getstr("H_heat",H_heat);

  taua   = getval("taua");
  bigTN = getval("bigTN");
  pwn = getval("pwn");
  tpwr = getval("tpwr");
  tsatpwr = getval("tsatpwr");
  dpwr = getval("dpwr");
  dhpwr2 = getval("dhpwr2");
  phase = (int) ( getval("phase") + 0.5);
  phase2 = (int) ( getval("phase2") + 0.5);
  sw1 = getval("sw1");
  sw2 = getval("sw2");
  ni2 = getval("ni2");
  ni = getval("ni");
  tauf = getval("tauf");
```

```
BigT1 = getval("BigT1");
pw_sl1 = getval("pw_sl1");
tpwrsl1 = getval("tpwrsl1");
phase_sl1 = getval("phase_sl1");
at = getval("at");

tpwrml = getval("tpwrml");
pwmlev = getval("pwmlev");

dhpwr = getval("dhpwr");
pwc = getval("pwc");

dpwr_cp = getval("dpwr_cp");
pwreb_cp = getval("pwreb_cp");

tau_eq = getval("tau_eq");

bigTN1 = getval("bigTN1");

d_co90 = getval("d_co90");
pwco90 = getval("pwco90");

d_csed = getval("d_csed");
dressed = getval("dressed");
pwcadec = getval("pwcadec");

time_sl = getval("time_sl");
deltaC = getval("deltaC");

omega_sl = getval("omega_sl");

taub = getval("taub");

sphase1 = getval("sphase1");

d_ca90 = getval("d_ca90");
pwca90 = getval("pwca90");
d_ca180 = getval("d_ca180");
pwca180 = getval("pwca180");
d_co180 = getval("d_co180");
pwco180 = getval("pwco180");

dof_ca = getval("dof_ca");

time_sl_max = getval("time_sl_max");

tpwr_waltz = getval("tpwr_waltz");
pw_waltz = getval("pw_waltz");

gt1 = getval("gt1");
gt2 = getval("gt2");
gt3 = getval("gt3");
gt4 = getval("gt4");
gt5 = getval("gt5");
gt6 = getval("gt6");
gt7 = getval("gt7");
```

```
  gt8 = getval("gt8");
  gt9 = getval("gt9");
  gt10 = getval("gt10");
  gt11 = getval("gt11");

  gzlvl1 = getval("gzlvl1");
  gzlvl2 = getval("gzlvl2");
  gzlvl3 = getval("gzlvl3");
  gzlvl4 = getval("gzlvl4");
  gzlvl5 = getval("gzlvl5");
  gzlvl6 = getval("gzlvl6");
  gzlvl7 = getval("gzlvl7");
  gzlvl8 = getval("gzlvl8");
  gzlvl9 = getval("gzlvl9");
  gzlvl10 = getval("gzlvl10");
  gzlvl11 = getval("gzlvl11");

/* LOAD PHASE TABLE */

  settable(t2,2, phi2);
  settable(t3,1, phi3);
  settable(t4,4, phi4);
  settable(t5,1, phi5);
  settable(t6,2, rec);

/* CHECK VALIDITY OF PARAMETER RANGES */

    if((dm[A] == 'y' || dm[B] == 'y' || dm[C] == 'y' ))
    {
        printf("incorrect dec1 decoupler flags!  ");
        abort(1);
    }

    if((dm2[A] == 'y' || dm2[B] == 'y' || dm2[C] == 'y'))
    {
        printf("incorrect dec2 decoupler flags! Should be 'nnnn' ");
        abort(1);
    }

    if( tsatpwr > 6 )
    {
        printf("TSATPWR too large !!!  ");
        abort(1);
    }

    if( dpwr > 36 )
    {
        printf("don't fry the probe, DPWR too large!  ");
        abort(1);
    }

    if( dpwr2 > 47 )
    {
        printf("don't fry the probe, DPWR2 too large!  ");
        abort(1);
    }
```

```
    if( pw > 200.0e-6 )
    {
        printf("dont fry the probe, pw too high ! ");
        abort(1);
    }

    if( pwn > 200.0e-6 )
    {
        printf("dont fry the probe, pwn too high ! ");
        abort(1);
    }

    if( gt1 > 3e-3 || gt2 > 3e-3 || gt3 > 3e-3
        || gt4 > 3e-3
      || gt5 > 3e-3 || gt6 > 3e-3
      || gt7 > 3e-3 || gt8 > 3e-3 || gt9 > 3e-3  || gt10 > 3e-3 || gt11 > 3e-3)
    {
       printf("gti values must be < 3e-3\n");
       abort(1);
    }

    if(tpwrsl > 25) {
       printf("tpwrsl must be less than 25\n");
       abort(1);
    }

    if( bigTN > 0.1) {
       printf("too long bigTN\n");
       abort(1);
    }


    if( pw_sl1 > 10e-3) {
       printf("too long pw_sl1\n");
       abort(1);
    }

    if(dpwr_cp > 61) {
      printf("dont fry the probe; dpwr_cp is too large !");
      abort(1);
    }

   if(pwreb_cp > 500e-6) {
       printf("pwreb_cp may be too long; < 500 us\n");
       abort(1);
   }

/* lower high power levels since used in CPMG-based transfers */

  if(CPMG_flg[A] == 'y')
   if(dhpwr2 > 60) {
       printf("lower dhpwr2: < 61\n");
       abort(1);
   }

   if(bigTN1 > 0.015) {
       printf("bigTN1 is too large; < 15 ms\n");
```

```
        abort(1);
    }

    if(2.0*bigTN1 + 5.5e-3 > .033) {
        printf("bigTN1 is too large; <13.75 ms\n");
        abort(1);
    }

   if(d_co90 > 52) {
        printf("d_co90 is too large; < 53\n");
        abort(1);
    }

   if(d_ca90 > 52) {
        printf("d_ca90 is too large; < 53\n");
        abort(1);
    }

   if(d_co180 > 59) {
        printf("d_co180 is too large; < 60\n");
        abort(1);
    }

   if(d_ca180 > 59) {
        printf("d_ca180 is too large; < 60\n");
        abort(1);
    }


    if(d_csed > 50) {
        printf("d_csed is too high; < 51\n");
        abort(1);
    }

    if(time_sl > 0.5) {
         printf("time_sl is too long; MUST be < 0.51 s to ensure 13C decoupling
does not fry probe\n");
         abort(1);
    }

    if(time_sl_max > 0.5) {
         printf("time_sl_max is too long; MUST be < 0.51 s to ensure 13C
decoupling does not fry probe\n");
         abort(1);
    }

    if(omega_sl > 200) {
         printf("omega_sl is too high; < 200 Hz\n");
         abort(1);
    }

    if(tpwr_waltz > 51) {
          printf("tpwr_waltz is too high; < 52\n");
          abort(1);
    }

/*  Phase incrementation for hypercomplex 2D data */
```

```
    if (phase == 2) {
    }
    if (phase2 == 2) {
      tsadd(t5,2,4);
      icosel = 1;
    }
    else icosel = -1;

/*  Set up f1180  tau1 = t1                */

    tau1 = d2;

    if(f1180[A] == 'y') {
        tau1 += ( 1.0 / (2.0*sw1) );
        if(tau1 < 0.2e-6) tau1 = 0.2e-6;
    }
    tau1 = tau1/2.0;

/*  Set up f2180  tau2 = t2                */

    tau2 = d3;
    if(f2180[A] == 'y') {
        tau2 += ( 1.0 / (2.0*sw2) );
        if(tau2 < 0.2e-6) tau2 = 0.2e-6;
    }
        tau2 = tau2/2.0;

/* Calculate modifications to phases for States-TPPI acquisition          */

   if( ix == 1) d2_init = d2 ;
   t1_counter = (int) ( (d2-d2_init)*sw1 + 0.5 );
   if(t1_counter % 2) {
    }

   if( ix == 1) d3_init = d3 ;
   t2_counter = (int) ( (d3-d3_init)*sw2 + 0.5 );
   if(t2_counter % 2) {
      tsadd(t3,2,4);
      tsadd(t6,2,4);
    }

/* adjust 13C sl powers  */
aa_sl = d_co90 + 20.0*log10(omega_sl/(1.0/(4.0*pwco90))) + 6.0;
dec_sl = floor(aa_sl);
bb_sl = -1.0*(dec_sl - (aa_sl - 6.0));

cc_sl = pow(10,bb_sl/20.0)*4095.0;


/* BEGIN ACTUAL PULSE SEQUENCE */

status(A);
   obspower(tsatpwr);     /* Set transmitter power for 1H presaturation */
   decpower(dpwr_cp);     /* Set Dec1 power for reburp pulses       */
   dec2power(dhpwr2);     /* Set Dec2 power for 15N hard pulses         */
```

```
   if(H_heat[A] == 'y') {

    obspower(tpwr_waltz);

    if(deltaC <= -10000) {
        obsunblank();
        obsprgon("CP9024090",pw_waltz,30.0);
        xmtron();
        delay(time_sl_max);
        xmtroff();
        obsprgoff();
        obsblank();
      }

      else if(time_sl_max - time_sl >= 0.2e-6) {
        obsunblank();
        obsprgon("CP9024090",pw_waltz,30.0);
        xmtron();
        delay(time_sl_max - time_sl);
        xmtroff();
        obsprgoff();
        obsblank();
      }

    }

/* now ensure that there is no 1H mag left */

    obspower(tpwr);
    rgpulse(pw,zero,4.0e-6,0.0);
    obspower(tsatpwr);

   delay(2.0e-6);
   rgradient('z',gzlvl1);
   delay(gt1*2.0);
   rgradient('z',0.0);
   delay(250.0e-6);

/* Presaturation Period */

status(B);

   if (fsat[0] == 'y')
   {
     delay(2.0e-5);
       rgpulse(d1,zero,2.0e-6,2.0e-6);  /* Presaturation */
     obspower(tpwr);   /* Set transmitter power for hard 1H pulses */
     delay(2.0e-5);
     if(fscuba[0] == 'y')
     {
          delay(2.2e-2);
          rgpulse(pw,zero,2.0e-6,0.0);
          rgpulse(2*pw,one,2.0e-6,0.0);
          rgpulse(pw,zero,2.0e-6,0.0);
          delay(2.2e-2);
     }
   }
```

```
   else
   {
    delay(d1);
   }
   obspower(tpwr);           /* Set transmitter power for hard 1H pulses */
   txphase(zero);
   dec2phase(zero);
   delay(1.0e-5);

/* Begin Pulses */

status(C);

   rcvroff();

   delay(20.0e-6);

   decpower(dhpwr);
   dec2rgpulse(pwn,zero,0.0,0.0);
   decrgpulse(pwc,zero,0.0,0.0);
   decpower(dpwr_cp);

   delay(0.2e-6);
   rgradient('z',gzlvl1);
   delay(gt1);
   rgradient('z',0.0);
   delay(250.0e-6);

   /* shaped pulse */
   rlpower(tpwrsl1,TODEV);
   shaped_pulse(shp_sl1,pw_sl1,three,2.0e-6,0.0);
   delay(2.0e-6);
   rlpower(tpwr,TODEV);
   /* shaped pulse */

   rgpulse(pw,zero,4.0e-6,0.0);                    /* 90 deg 1H pulse */

   delay(0.2e-6);
   rgradient('z',gzlvl2);
   delay(gt2);
   rgradient('z',0.0);
   delay(2.0e-6);

   delay(taua - gt2 - 2.2e-6);   /* taua <= 1/4JNH */

   sim3pulse(2.0*pw,0.0e-6,2.0*pwn,zero,zero,zero,0.0,0.0);

   dec2phase(zero); decphase(zero);

   delay(taua - gt2 - 200.2e-6 - 2e-6);

   delay(0.2e-6);
   rgradient('z',gzlvl2);
   delay(gt2);
   rgradient('z',0.0);
   delay(200.0e-6);
```

```
   rgpulse(pw,one,2.0e-6,0.0);

   delay(0.2e-6);
   rgradient('z',gzlvl3);
   delay(gt3);
   rgradient('z',0.0);
   delay(250.0e-6);

 if(CPMG_flg[A] == 'y') {

   dec2rgpulse(pwn,one,2.0e-6,0.0);

   delay(5.5e-3/4.0 - WFG3_START_DELAY - 0.5*pwreb_cp);

sim3shaped_pulse("hard",sh_cpmg,"hard",2.0*pw,pwreb_cp,2.0*pwn,zero,zero,zero,0.0
,0.0);
   delay(5.5e-3/4.0 - 0.5*pwreb_cp - WFG3_STOP_DELAY); txphase(two);

   delay(5.5e-3/4.0 - WFG3_START_DELAY - 0.5*pwreb_cp);

sim3shaped_pulse("hard",sh_cpmg,"hard",2.0*pw,pwreb_cp,2.0*pwn,two,zero,zero,0.0,
0.0);
   txphase(zero);
   delay(5.5e-3/4.0 - 0.5*pwreb_cp - WFG3_STOP_DELAY
         - POWER_DELAY - 2.0e-6 - pwmlev - 2.0e-6 - PRG_START_DELAY);

   obspower(tpwrml);
   rgpulse(pwmlev,one,2.0e-6,0.0); txphase(zero);
   delay(2.0e-6);

   /* H decoupling on */
   obsprgon("waltz16",pwmlev,90.0);
   xmtron();
   /* H decoupling on */

  initval(2.0,v8);
  loop(v8,v9);

   initval(2.0,v1);
   loop(v1,v2);

   decphase(zero); dec2phase(zero);
   delay(bigTN1/32.0 - WFG3_START_DELAY - 0.5*pwreb_cp);

sim3shaped_pulse("hard",sh_cpmg,"hard",0.0,pwreb_cp,2.0*pwn,zero,zero,zero,0.0,0.
0);
   delay(bigTN1/32.0 - 0.5*pwreb_cp - WFG3_STOP_DELAY);

   decphase(one); dec2phase(one);
   delay(bigTN1/32.0 - WFG3_START_DELAY - 0.5*pwreb_cp);

sim3shaped_pulse("hard",sh_cpmg,"hard",0.0,pwreb_cp,2.0*pwn,zero,one,one,0.0,0.0)
;
   delay(bigTN1/32.0 - 0.5*pwreb_cp - WFG3_STOP_DELAY);

   endloop(v2);
```

```
   initval(2.0,v1);
   loop(v1,v2);

   decphase(one); dec2phase(one);
   delay(bigTN1/32.0 - WFG3_START_DELAY - 0.5*pwreb_cp);

sim3shaped_pulse("hard",sh_cpmg,"hard",0.0,pwreb_cp,2.0*pwn,zero,one,one,0.0,0.0)
;
   delay(bigTN1/32.0 - 0.5*pwreb_cp - WFG3_STOP_DELAY);

   decphase(zero); dec2phase(zero);
   delay(bigTN1/32.0 - WFG3_START_DELAY - 0.5*pwreb_cp);

sim3shaped_pulse("hard",sh_cpmg,"hard",0.0,pwreb_cp,2.0*pwn,zero,zero,zero,0.0,0.
0);
   delay(bigTN1/32.0 - 0.5*pwreb_cp - WFG3_STOP_DELAY);

   endloop(v2);


   initval(2.0,v1);
   loop(v1,v2);

   decphase(two); dec2phase(two);
   delay(bigTN1/32.0 - WFG3_START_DELAY - 0.5*pwreb_cp);

sim3shaped_pulse("hard",sh_cpmg,"hard",0.0,pwreb_cp,2.0*pwn,zero,two,two,0.0,0.0)
;
   delay(bigTN1/32.0 - 0.5*pwreb_cp - WFG3_STOP_DELAY);

   decphase(three); dec2phase(three);
   delay(bigTN1/32.0 - WFG3_START_DELAY - 0.5*pwreb_cp);

sim3shaped_pulse("hard",sh_cpmg,"hard",0.0,pwreb_cp,2.0*pwn,zero,three,three,0.0,
0.0);
   delay(bigTN1/32.0 - 0.5*pwreb_cp - WFG3_STOP_DELAY);

   endloop(v2);


   initval(2.0,v1);
   loop(v1,v2);

   decphase(three); dec2phase(three);
   delay(bigTN1/32.0 - WFG3_START_DELAY - 0.5*pwreb_cp);

sim3shaped_pulse("hard",sh_cpmg,"hard",0.0,pwreb_cp,2.0*pwn,zero,three,three,0.0,
0.0);
   delay(bigTN1/32.0 - 0.5*pwreb_cp - WFG3_STOP_DELAY);

   decphase(two); dec2phase(two);
   delay(bigTN1/32.0 - WFG3_START_DELAY - 0.5*pwreb_cp);

sim3shaped_pulse("hard",sh_cpmg,"hard",0.0,pwreb_cp,2.0*pwn,zero,two,two,0.0,0.0)
;
   delay(bigTN1/32.0 - 0.5*pwreb_cp - WFG3_STOP_DELAY);
```

```
   endloop(v2);
  endloop(v9);

   dec2rgpulse(pwn,one,1.0e-6,0.0);

   /* H decoupling off */
   xmtroff();
   obsprgoff();
   /* H decoupling off */

   rgpulse(pwmlev,three,2.0e-6,0.0);

   obspower(tpwr);

 }

  else {

   dec2rgpulse(pwn,one,2.0e-6,0.0);
   dec2phase(zero);

   delay(5.5e-3 - POWER_DELAY - 2.0e-6 - pwmlev - 2.0e-6 - PRG_START_DELAY);

   obspower(tpwrml);
   rgpulse(pwmlev,one,2.0e-6,0.0); txphase(zero);
   delay(2.0e-6);

   /* H decoupling on */
   obsprgon("waltz16",pwmlev,90.0);
   xmtron();
   /* H decoupling on */

  delay(bigTN1 - 5.5e-3/2.0);

   dec2rgpulse(2.0*pwn,zero,0.0,0.0);
   decshaped_pulse(sh_cpmg,pwreb_cp,zero,0.0,0.0);

  delay(bigTN1 + 5.5e-3/2.0 - WFG_START_DELAY - pwreb_cp - WFG_STOP_DELAY - 2.0e-
6);

   dec2rgpulse(pwn,one,2.0e-6,0.0);

   /* H decoupling off */
   xmtroff();
   obsprgoff();
   /* H decoupling off */

   rgpulse(pwmlev,three,2.0e-6,0.0);

   obspower(tpwr);

  } /* end of CPMG_flg == n */

   delay(2.0e-6);
   rgradient('z',gzlvl4);
   delay(gt4);
```

```
   rgradient('z',0.0);
   delay(200e-6);

  /* now magnetization is NzCOz  */

   decpower(d_co90);
   decrgpulse(pwco90,zero,4.0e-6,0.0);

   decpower(d_ca180);  /* BS pulse  */
   decshaped_pulse(spca180,pwca180,zero,2.0e-6,0.0);

   delay(taub - POWER_DELAY - 2.0e-6 - WFG_START_DELAY - pwca180 - WFG_STOP_DELAY
         - POWER_DELAY - 2.0e-6);

   /* adjust phase */
   initval(1.0,v3);
   decstepsize(sphase1);
   dcplrphase(v3);
   /* adjust phase */

   decpower(d_co180);
   decrgpulse(pwco180,zero,2.0e-6,2.0e-6);
   dcplrphase(zero);

   decpower(d_ca180);
   decshaped_pulse(spca180,pwca180,zero,2.0e-6,0.0);

   delay(taub - 2.0e-6 - POWER_DELAY - 2.0e-6 - WFG_START_DELAY - pwca180 -
WFG_STOP_DELAY
         - POWER_DELAY - 2.0e-6);

   decpower(d_co90);
   decrgpulse(pwco90,one,2.0e-6,2.0e-6);

   decphase(zero);

   delay(2.0e-6);
   rgradient('z',gzlvl10);
   delay(gt10);
   rgradient('z',0.0);
   delay(200e-6);

   decoffset(dof_ca);

   delay(tau_eq);

   decpower(d_ca90);
   decrgpulse(pwca90,t2,4.0e-6,0.0);
   decrgpulse(pwca90,zero,4.0e-6,0.0);

   delay(2.0e-6);
   rgradient('z',gzlvl4);
   delay(gt4/2.0);
   rgradient('z',0.0);
   delay(200e-6);

  /* Now do the CEST */
```

```
    decpower(dec_sl); decpwrf(cc_sl); decphase(zero);
    obspower(tpwr_waltz);

    decoffset(dof_ca + deltaC);

    delay(2.0e-6);

      if(time_sl > 0.2e-6 && deltaC > -10000) {
       obsprgon("CP9024090",pw_waltz,30.0);
       xmtron();
       if(omega_sl > 0.0);
         decon();

         delay(time_sl);
         xmtroff();
         obsprgoff();

        if(omega_sl > 0.0)
         decoff();
      }

    decpwrf(4095.0);

    decoffset(dof);
  /* Now do the CEST */


   delay(0.2e-6);
   rgradient('z',gzlvl5);
   delay(gt5);
   rgradient('z',0.0);
   delay(200.0e-6);

   delay(tau_eq);

   decpower(d_co90);
   decrgpulse(pwco90,zero,4.0e-6,0.0);

   delay(taub
         - POWER_DELAY - 2.0e-6 - WFG_START_DELAY - pwca180 - WFG_STOP_DELAY -
POWER_DELAY - 2.0e-6);

   decpower(d_ca180);
   decshaped_pulse(spca180,pwca180,zero,2.0e-6,0.0);

   /* adjust phase */
   initval(1.0,v3);
   decstepsize(sphase1);
   dcplrphase(v3);
   /* adjust phase */

   decpower(d_co180);
   decrgpulse(pwco180,zero,2.0e-6,2.0e-6);
   dcplrphase(zero);

   delay(taub - 2.0e-6
```

```
        - POWER_DELAY - 2.0e-6 - WFG_START_DELAY - pwca180 - WFG_STOP_DELAY -
POWER_DELAY - 2.0e-6);

   decpower(d_ca180);  /* BS pulse  */
   decshaped_pulse(spca180,pwca180,zero,2.0e-6,0.0);

   decpower(d_co90);
   decrgpulse(pwco90,one,2.0e-6,0.0);

   delay(2.0e-6);
   rgradient('z',gzlvl11);
   delay(gt11);
   rgradient('z',0.0);
   delay(200e-6);

   obspower(tpwrml);
   rgpulse(pwmlev,one,2.0e-6,0.0); txphase(zero);
   delay(2.0e-6);

   /* H decoupling on */
   obsprgon("waltz16",pwmlev,90.0);
   xmtron();
   /* H decoupling on */

   /* CA dec on */
   decpower(d_csed);
   decprgon(cadecseq,pwcadec,dressed);
   decon();
   /* CA dec on */

   dec2rgpulse(pwn,t3,2.0e-6,0.0);
   dec2phase(t4); decphase(zero);

   if(bigTN - tau2 >= 0.2e-6)  {

      delay(bigTN - tau2);

      /* CA DEC off */
      decoff();
      decprgoff();
      /* CA DEC off */

      dec2rgpulse(2*pwn,t4,0.0,0.0);
      decpower(dhpwr);
      decrgpulse(2.0*pwc,zero,4.0e-6,2.0e-6);

   /* CA dec on */
   decpower(d_csed);
   decprgon(cadecseq,pwcadec,dressed);
   decon();
   /* CA dec on */

     delay(bigTN + tau2
        - POWER_DELAY - 4.0e-6
        - 2.0*pwc - 2.0e-6
        - 5.5e-3
        + PRG_STOP_DELAY - POWER_DELAY - PRG_START_DELAY);
```

```
  dec2phase(t5);

/* H decoupling off */
xmtroff();
obsprgoff();
/* H decoupling off */

rgpulse(pwmlev,three,2.0e-6,0.0);
obspower(tpwr);

delay(5.5e-3 - PRG_STOP_DELAY - 2.0e-6 - pwmlev
      - POWER_DELAY - 0.2e-6 - gt6 - 1000e-6
      - 2.0*GRADIENT_DELAY - PRG_STOP_DELAY);

   /* CA DEC off */
   decoff();
   decprgoff();
   /* CA DEC off */

}

else {

   dec2rgpulse(2*pwn,t4,2.0e-6,2.0e-6);

   delay(tau2 - bigTN);

   /* CA DEC off */
   decoff();
   decprgoff();
   /* CA DEC off */

   decpower(dhpwr);
   decrgpulse(2.0*pwc,zero,4.0e-6,2.0e-6);

/* CA dec on */
decpower(d_csed);
decprgon(cadecseq,pwcadec,dressed);
decon();
/* CA dec on */

  delay(bigTN + tau2
     - POWER_DELAY - 4.0e-6
     - 2.0*pwc - 2.0e-6
     - 5.5e-3 - PRG_STOP_DELAY - POWER_DELAY - PRG_START_DELAY);

  dec2phase(t5);

/* H decoupling off */
xmtroff();
obsprgoff();
/* H decoupling off */

rgpulse(pwmlev,three,2.0e-6,0.0);
obspower(tpwr);
```

```
delay(5.5e-3 - PRG_STOP_DELAY - 2.0e-6 - pwmlev
      - POWER_DELAY - 0.2e-6 - gt6 - 1000e-6
      - 2.0*GRADIENT_DELAY - PRG_STOP_DELAY);

   /* CA DEC off */
   decoff();
   decprgoff();
   /* CA DEC off */

}

delay(0.2e-6);
rgradient('z',icosel*gzlvl6);
delay(gt6);
rgradient('z',0.0);
delay(1000.0e-6);

sim3pulse(pw,0.0e-6,pwn,zero,zero,t5,0.0,0.0);

decpower(dhpwr);
decrgpulse(pwc,zero,4.0e-6,0.0);

delay(0.2e-6);
rgradient('z',gzlvl7);
delay(gt7);
rgradient('z',0.0);
delay(2.0e-6);

dec2phase(zero);
delay(tauf - POWER_DELAY - 4.0e-6
           - pwc - gt7 - 2.2e-6);

sim3pulse(2.0*pw,0.0e-6,2.0*pwn,zero,zero,zero,0.0,0.0);

txphase(one);
dec2phase(one);

delay(tauf - gt7 - 200.2e-6);

delay(0.2e-6);
rgradient('z',gzlvl7);
delay(gt7);
rgradient('z',0.0);
delay(200.0e-6);

sim3pulse(pw,0.0e-6,pwn,one,zero,one,0.0,0.0);

delay(0.2e-6);
rgradient('z',gzlvl8);
delay(gt8);
rgradient('z',0.0);
delay(2.0e-6);

txphase(zero);
dec2phase(zero);

delay(tauf - gt8 - 2.2e-6 - 0.5*(pwn-pw));
```

```
   sim3pulse(2.0*pw,0.0e-6,2.0*pwn,zero,zero,zero,0.0,0.0);

   delay(tauf - gt8 - 200.2e-6);

   delay(0.2e-6);
   rgradient('z',gzlvl8);
   delay(gt8);
   rgradient('z',0.0);
   delay(200.0e-6);

   rgpulse(pw,zero,0.0,0.0);

   delay(BigT1);

   rgpulse(2*pw,zero,0.0,0.0);

   delay(2.0e-6);
   rgradient('z',gzlvl9);
   delay(gt9);
   rgradient('z',0.0);
   delay(100.0e-6);

   delay(BigT1 - gt9 - 2.0*POWER_DELAY - 102.0e-6 - 2.0*GRADIENT_DELAY);

   dec2power(dpwr2);  /* set power for 15N decoupling */
   decpower(dpwr);

/*   rcvron();  */          /* Turn on receiver to warm up before acq */

/* BEGIN ACQUISITION */

status(D);
         setreceiver(t6);

}
```

```
gzlvl11 1 1 32768 -32768 1 2 1 0 1 64
1 6500
0
dmg1 2 2 8 0 0 4 1 0 1 64
1 ""
4 "" "av1" "ph1" "pwr1"
dcodpwr 7 1 61 0 0 2 1 0 1 64
1 57
0
console 2 2 8 0 0 2 1 0 1 64
1 "inova"
0
axis 4 2 4 0 0 4 1 0 1 64
1 "pd"
11 "c" "d" "1" "2" "3" "h" "k" "m" "n" "p" "u"
arraydim 7 1 32768 1 1 2 1 5 1 64
1 1
0
aig 2 2 2 0 0 4 1 1 1 64
1 "ai"
2 "nm" "ai"
acqcycles 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 1
0
CPMG_flg 2 2 8 0 0 2 1 0 1 64
1 "n"
0
BigT1 3 1 14 14 14 2 1 8192 1 64
1 0.0005
0
H_heat 2 2 8 0 0 2 1 0 1 64
1 "y"
0
acqdim 7 1 1000000000 -1000000000 0 2 1 0 1 64
1 1
0
acqstatus 7 1 32767 0 0 2 1 0 1 64
2 17 1
0
alock 2 2 8 0 0 2 1 0 1 64
1 "n"
5 "a" "n" "s" "u" "y"
alfa 6 1 8192 -8192 1e-07 2 1 8194 1 64
1 6.6
0
ap 2 2 1023 0 0 4 1 6 1 64
1
"1:SAMPLE:date,solvent,file;1:ACQUISITION:sfrq:3,tn:2,at:3,np:0,sw:1,fb:0,bs(bs):
0,ss(ss):0,tpwr(tpwr):0,pw:1,p1(p1):1,d1:3,d2(d2):3,tof:1,nt:0,ct:0,alock,gain:0;
1:FLAGS:il,in,dp,hs;1(ni):2D ACQUISITION:sw1:1,ni:0,phase:0;1(ni2):3D
ACQUISITION:d3:0,sw2:1,ni2:0,phase2:0;1:DISPLAY:sp:1,wp:1,vs:0,sc:0,wc:0,hzmm:2,i
s:2,rfl:1,rfp:1,th:0,ins:3,aig*,dcg*,dmg*;1(ni):2D
DISPLAY:sp1:1,wp1:1,sc2:0,wc2:0,rfl1:1,rfp1:1;2:DEC. &
VT:dfrq:3,dn,dpwr:0,dof:1,dm,dmm,dmf,dseq,dres:1,homo,temp(temp):1;2(numrfch >
2):DEC2:dfrq2:3,dn2,dpwr2:0,dof2:1,dm2,dmm2,dmf2:0,dseq2,dres2:1;2:PROCESSING:cf(
nf):0,lb(lb):2,sb(sb):3,sbs(sb):3,gf(gf):3,gfs(gf):3,awc(awc):3,lsfid(lsfid):0,ph
fid(phfid):1,wtfile,proc,fn:0,math,,werr,wexp,wbs,wnt;2(ni):2D
```

```
PROCESSING:lb1(lb1):3,sb1(sb1):3,sbs1(sb1):3,gf1(gf1):3,gfs1(gf1):3,awc1(awc1):3,
wtfile1,proc1,fn1:0;2(ni2):3D
PROCESSING:lb2(lb2):2,sb2(sb2):3,sbs2(sb2):3,gf2(gf2):3,gfs2(gf2):3,awc2(awc2):3,
wtfile2,proc2,fn2:0;"
0
ampmode 2 2 8 0 0 2 1 0 1 64
1 "dddp"
0
array 2 2 256 0 0 2 1 1 1 64
1 ""
0
at 1 1 14 14 14 2 1 8203 1 64
1 0.0637714
0
arrayelemts 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
0
awc1 1 1 1 -1 0.001 3 1 1 0 64
1 0
0
awc 1 1 1 -1 0.001 3 1 1 0 64
1 0
0
awc2 1 1 1 -1 0.001 3 1 1 0 64
1 0
0
celem 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
0
bigTN1 3 1 14 14 14 2 1 8192 1 64
1 0.01
0
bigTN 3 1 14 14 14 2 1 8192 1 64
1 0.014
0
axisf 4 2 4 0 0 4 1 0 1 64
1 "s"
4 "m" "n" "s" "u"
c13_de 3 1 14 14 14 2 1 8192 1 64
1 0.001
0
bs 7 1 32767 0 1 2 1 0 1 64
1 16
0
cadecseq 2 2 8 0 0 2 1 0 1 64
1 "sed_118p"
0
cofrq 5 1 1000000000 -1000000000 0 2 1 0 1 64
1 10800
0
cf 7 1 32767 0 1 3 1 1 0 64
1 1
0
d2 3 1 14 14 14 2 1 8194 1 64
1 0
0
ct 7 1 1000000000 0 1 2 1 6 1 64
```

```
1 0
0
cr 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 -88656.5101911
0
cp 2 2 1 0 0 2 1 0 1 64
1 "y"
2 "y" "n"
cr2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 14687.9994401
0
cr1 1 1 1000000000 -1000000000 0 4 1 3 1 64
1 7634.26857398
0
crf 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0
0
d1 3 1 14 14 14 2 1 8194 1 64
1 2.5
0
cutoff 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 0 64
1 200
0
dataProcessed 1 1 9.99999984307e+17 -9.99999984307e+17 0 3 1 0 1 64
1 0
0
d_ca90 1 1 9 9 9 2 1 8192 1 64
1 51
0
d_ca180 1 1 9 9 9 2 1 8192 1 64
1 58
0
d3 3 1 14 14 14 2 1 8194 1 64
1 0
0
d_co90 1 1 9 9 9 2 1 8192 1 64
1 51
0
d_co180 1 1 9 9 9 2 1 8192 1 64
1 58
0
d_csed 1 1 9 9 9 2 1 8192 1 64
1 48
0
dcapwr 7 1 77 0 1 2 1 0 1 64
1 64
0
date 2 2 9 0 0 2 1 1 1 64
1 "Aug  1 2012"
0
dataid 2 2 8 0 0 2 1 0 1 64
1 ""
0
datname 2 2 8 0 0 3 1 0 1 64
1 ""
0
dco90pwr 7 1 32767 0 0 2 1 0 1 64
```

```
1 52
0
dcg 2 2 3 0 0 4 1 1 1 64
1 ""
2 "dc" "cdc"
dhpwr 1 1 9 9 9 2 1 8192 1 64
1 63
0
dfrq2 1 1 1000000000 0 0 2 1 9 1 64
1 60.6833571
0
delta2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 703.534557616
0
delta 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 3068.25380068
0
dconi 2 2 8 0 0 2 1 0 1 64
1 "dpcon"
0
decfrq 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 -3000
0
delta1 3 1 2000000 0 0 2 1 0 1 64
1 1527.50276212
0
deltafrq 5 1 1000000000 -1000000000 0 2 1 0 1 64
1 -19000
0
deltaf 1 1 100 0 0 4 1 0 1 64
1 0.0096
0
deltaC 5 1 1000000000 -1000000000 0 2 1 0 1 64
1 0
0
dfrq 5 1 1000000000 -1000000000 0 2 1 8 1 64
1 150.5951827
0
deltaone 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
0
dg3 2 2 8 0 0 2 1 0 1 64
1 "1:CHANNEL 4:dfrq3,dn3,dpwr3,dseq3,dres3,dm3,dmm3,dmf3,homo3;"
0
dg1 2 2 8 0 0 4 1 0 1 64
1
"1:DISPLAY:sp:1,wp:1,sp1(ni):1,wp1(ni):1,sp2(ni2):1,wp2(ni2):1;1:FID:sf:3,wf:3,vf
:0;1:FLAGS:aig*,dcg*,pmode*(ni),dmg*,dmg1*(ni),dmg2*(ni2);2:REFERENCING:rfl:1,rfp
:1,cr:1,delta:1,,rfl1(ni):1,rfp1(ni):1,cr1(ni):1,delta1(ni):1,,rfl2(ni2):1,rfp2(n
i2):1,cr2(ni2):1,delta2(ni2):1;3:CHART:sc:0,wc:0,sc2(ni):0,wc2(ni):0,,hzmm:2,vs:1
,vp:1,th:1,ho:2,vo:2,axis,,pltmod,rplot;4(ni):DIMENSIONS:trace,plane(ni2);4:INTEG
RAL:intmod,is:2,ins:3,io:0,,lvl:3,tlt:3;4(ni2):3D
OPTIONS:fiddc3d,specdc3d,ptspec3d,ntype3d,ss3d;"
0
dg 2 2 1023 0 0 4 1 6 1 64
1 "1:3D
ACQUISITION:sw:1,sw1:1,sw2:1,ni:0,ni2:0,phase:0,phase2:0,ss:0,nt:0,at:3,np,gain,t
```

```
emp:1,date;1:PULSE
SEQUENCE:seqfil;2:DELAYS:taua:4,taub:4,tauf:4,bigTN:4,bigTN1:4,BigT1:5,tau_eq:3,d
1:3,time_sl:4,time_sl_max:4,d2(d2):6,d3(d3):6,alfa:1,sphase1:2;3:CHANNEL
1:sfrq:3,tn,tof:1,tpwr:0,tpwr_waltz:0,tpwrml:0,tsatpwr:0,tpwrsl1:0,pw:2,pw_waltz:
2,pwmlev:2,pw_sl1:2,phase_sl1:2;3:FLAGS:fsat,fscuba,f1180,f2180,shp_sl1,CPMG_flg;
4:SPECIAL:omega_sl:4,deltaC:4,H_heat;4:CHANNEL
3:dfrq2:3,dn2,dof2:1,dhpwr2:0,dpwr2:0,pwn:2,dm2,dmm2,dmf2,dseq2,dres2;"
0
dfrq3 1 1 1000000000 0 0 2 1 9 1 64
1 91.9202953
0
dg2 2 2 8 0 0 2 1 0 1 64
3 "1:CHANNEL
2:dfrq:3,dn,dof:1,dof_ca:1,dhpwr:0,pwc:2,dpwr_cp:0,d_co90:0,d_ca90:0,d_co180:0,d_
ca180:0,d_csed:0,dpwr:0,pwco90:2,pwca90:2,pwco180:2,pwca180:2,pwreb_cp:2,pwcadec:
2,spca180,sh_cpmg,cadecseq,dm,dpwrf,dseq,dres,dressed,dmf,dmm;"
"2:GRADIENTS:gt1:4,gzlvl1:0,gt2:4,gzlvl2:0,gt3:4,gzlvl3:0,gt4:4,gzlvl4:0,gt5:4,gz
lvl5:0,gt6:5,gzlvl6:0,gt7:4,gzlvl7:0,gt8:4,gzlvl8:0,gt9:7,gzlvl9:0,gt10:7,gzlvl10
:0,gt11:7,gzlvl11:0;"
"4:CHANNEL 4:dfrq3:3,dn3,dof3:1,dpwr3:0,dm3,dmm3,ampmode;"
0
dgs 2 2 1023 0 0 4 1 6 1 64
5 "1:AXIAL SHIMS:z1:0,z2:0,z3:0,z4:0,z5:0,z6:0,z7:0;"
"2:NON AXIAL
SHIMS:x1:0,y1:0,xz:0,yz:0,xy:0,x2y2:0,x3:0,y3:0,xz2:0,yz2:0,zxy:0,zx2y2:0,z3x:0,z
3y:0,z2x2y2:0,z2xy:0;"
"3:NON AXIAL
SHIMS:zx3:0,zy3:0,x4:0,y4:0,z4x:0,z4y:0,z3x2y2:0,z3xy:0,z2x3:0,z2y3:0,z3x3:0,z3y3
:0,z4x2y2:0,z4xy:0,z5x:0,z5y:0;"
"4:AUTOMATION:method,wshim,load,,spin:0,gain:0,alock,loc:0;"
"4:SPECIAL:temp;"
0
dglp 2 2 8 0 0 4 1 7 1 64
1
"1(lpfilt):LP:lpalg,lpopt,lpfilt:0,lpnupts:0,strtlp:0,lpext:0,strtext:0;2(lpfilt1
):LP
1:lpalg1,lpopt1,lpfilt1:0,lpnupts1:0,strtlp1:0,lpext1:0,strtext1:0;3(lpfilt2):LP
2:lpalg2,lpopt2,lpfilt2:0,lpnupts2:0,strtlp2:0,lpext2:0,strtext2:0;4:LP
OUTPUT:lpprint(lpfilt):0,lptrace(lpfilt):0,lpprint1(lpfilt1):0,lptrace1(lpfilt1):
0,lpprint2(lpfilt2):0,lptrace2(lpfilt2):0;"
0
dgp 2 2 8 0 0 4 1 0 1 64
1
"1:CONDITIONAL:werr,wexp,wbs,wnt;1:PHASE:rp:1,lp:1,rp1(ni):1,lp1(ni):1,rp2(ni2):1
,lp2(ni2):1;2:WEIGHT:lb:3,sb:3,sbs(sb):3,gf:3,gfs(gf):3,awc:3,wtfile;2:PROCESS:cf
(nf):0,phfid:1,lsfrq:1,proc,fn:0;3(ni):WEIGHT
1:lb1:3,sb1:3,sbs1(sb1):3,gf1:3,gfs1(gf1):3,awc1:3,wtfile1;3(ni):PROCESS
1:phfid1:1,lsfrq1:1,proc1,fn1:0;4(ni2):WEIGHT
2:lb2:3,sb2:3,sbs2(sb2):3,gf2:3,gfs2(gf2):3,awc2:3,wtfile2;4(ni2):PROCESS
2:phfid2:1,lsfrq2:1,proc2,fn2:0;"
0
dhipwr 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 63
0
dh2pwr 7 1 77 0 1 2 1 0 1 64
1 0
0
```

```
dhp 1 1 9 9 9 2 1 8192 0 64
1 40
0
dm2 2 2 8 0 0 2 1 0 1 64
1 "nnny"
0
dlowpwr 7 1 32767 0 0 2 1 0 1 64
1 46
0
disCmd 2 2 8 0 0 4 1 0 1 64
1 ""
0
dhpwr2 1 1 18 18 18 2 1 8192 1 64
1 59
0
dm 4 2 4 0 0 2 1 0 1 64
1 "nnnn"
4 "a" "n" "s" "y"
dlp 7 1 10 10 10 2 1 8194 0 64
1 10
0
dmf3 7 1 2000000 1 0 2 1 2 1 64
1 2000
0
dmf 7 1 11 11 11 2 1 8194 1 64
1 25000
0
dm3 4 2 4 0 0 2 1 0 1 64
1 "nnnn"
4 "a" "n" "s" "y"
dmf2 7 1 100000 1 0 2 1 2 1 64
1 3703
0
dmg 2 2 2 0 0 4 1 3 1 64
1 "ph"
0
flag3d 2 2 8 0 0 2 1 0 1 64
1 "y"
0
dpwrf 7 1 4095 0 1 2 1 2 1 64
1 4095
0
dpwr 7 1 9 9 9 2 1 8194 1 64
1 -16
0
dod 3 1 14 14 14 2 1 8194 1 64
1 0.00999999977648
0
dmm3 4 2 4 0 0 2 1 0 1 64
1 "cccc"
9 "c" "f" "g" "m" "p" "r" "u" "w" "x"
dmm 4 2 4 0 0 2 1 0 1 64
1 "cccp"
9 "c" "f" "g" "m" "p" "r" "u" "w" "x"
dmm2 2 2 8 0 0 2 1 0 1 64
1 "cccw"
0
```

```
dn2 2 2 8 0 0 2 1 8 1 64
1 "N15"
0
dn 2 2 4 0 0 2 1 8 1 64
1 "C13"
0
dn3 2 2 8 0 0 2 1 8 1 64
1 "H2"
0
dof3 5 1 20 20 20 2 1 8202 1 64
1 -235
0
dof2 5 1 16 16 16 2 1 8202 1 64
1 1671
0
dof 5 1 8 8 8 2 1 8202 1 64
1 12336.3850003
0
dotflag 2 2 8 0 0 4 1 0 1 64
1 "n"
2 "n" "y"
dof_ca 5 1 1000000000 -1000000000 0 2 1 0 1 64
1 -5886.05042429
0
dp 2 2 1 0 0 2 1 0 1 64
1 "y"
2 "y" "n"
dpwr3_D 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 8192 1 64
1 49
0
dpwr2 7 1 18 18 18 2 1 8194 1 64
1 44
0
dpwr3 7 1 21 21 21 2 1 8194 1 64
1 -16
0
dpwr_cp 1 1 9 9 9 2 1 8192 1 64
1 61
0
f1180 2 2 8 0 0 2 1 0 1 64
1 "n"
0
dseq3 2 2 8 0 0 2 1 0 1 64
1 ""
0
dressed 7 1 360 0 0.5 2 1 0 1 64
1 2
0
dres2 7 1 360 1 0 2 1 0 1 64
1 90
0
dres 7 1 360 1 0 2 1 0 1 64
1 9
0
dres3 7 1 360 1 0 2 1 0 1 64
1 1
0
```

```
dseq 2 2 8 0 0 2 1 0 1 64
1 "dec_wave"
0
dseq2 2 2 8 0 0 2 1 0 1 64
1 "waltz16"
0
exp3D 2 2 8 0 0 2 1 0 1 64
1 "n"
0
dvhpwr 1 1 9 9 9 2 1 8192 1 64
1 58
0
exppath 2 2 8 0 0 2 1 0 1 64
1 "/space/guest/vnmrsys/exp10/acqfil"
0
fb 7 1 6 6 6 2 1 8203 0 64
1 5000
0
fad1 2 2 8 0 0 2 1 0 1 64
1 "y"
0
f2180 2 2 8 0 0 2 1 0 1 64
1 "n"
0
f1coef 2 2 8 0 0 3 1 1 1 64
1 ""
0
f2coef 2 2 8 0 0 3 1 1 1 64
1 ""
0
fad2 2 2 8 0 0 2 1 0 1 64
1 "n"
0
file 2 2 6 0 0 2 1 3 1 64
1 "/space/guest/vnmrsys/parlib/hnco_CO_CEST_600_lek_v2"
0
fiddc3d 4 2 4 0 0 3 1 0 1 64
1 "nnn"
0
fidid 2 2 8 0 0 2 1 0 1 64
1 ""
0
filtfile 2 2 8 0 0 2 1 0 1 64
1 ""
0
filter 7 1 1000000000 0 1 2 1 2 1 64
1 54.0999984741
0
gfs 1 1 1000 -1000 0.001 3 1 1 0 64
1 0.05
0
fpmult2 1 1 1000000000 0 0 3 1 0 0 64
1 0
0
fn2 7 1 524288 64 -2 3 1 1 1 64
1 128
0
```

```
fn 7 1 524288 64 -2 3 1 1 1 64
1 8192
0
fmlev 4 2 4 0 0 2 1 0 1 64
1 "n"
0
fn1 7 1 524288 64 -2 3 1 1 1 64
1 128
0
fpmult 1 1 1000000000 0 0 3 1 0 1 64
1 1
0
fnoesy 4 2 4 0 0 2 1 0 1 64
1 "n"
0
fpmult1 1 1 1000000000 0 0 3 1 0 1 64
1 0.5
0
gf 1 1 100000 0 0 3 1 1 1 64
1 0.0455229245126
0
fscuba 4 2 4 0 0 2 1 0 1 64
1 "n"
0
fsat 2 2 8 0 0 2 1 0 1 64
1 "n"
0
gain 1 1 60 0 2 2 1 0 1 64
1 28
0
gf2 1 1 100000 0 0 3 1 1 0 64
1 0
0
gf1 1 1 100000 0 0 3 1 1 0 64
1 0.0050210384652
0
gt4 3 1 14 14 14 2 1 8192 1 64
1 0.001
0
gt10 3 1 14 14 14 2 1 8192 1 64
1 0.0008
0
gfs2 1 1 1000 -1000 0.001 3 1 1 0 64
1 0
0
gfs1 1 1 1000 -1000 0.001 3 1 1 0 64
1 0
0
gt1 3 1 14 14 14 2 1 8192 1 64
1 0.0005
0
gt2 3 1 14 14 14 2 1 8192 1 64
1 0.0005
0
gt11 3 1 14 14 14 2 1 8192 1 64
1 0.0004
0
```

```
gt3 3 1 14 14 14 2 1 8192 1 64
1 0.001
0
gt8 3 1 14 14 14 2 1 8192 1 64
1 0.0004
0
gt6 3 1 14 14 14 2 1 8192 1 64
1 0.00125
0
gt5 3 1 14 14 14 2 1 8192 1 64
1 0.0006
0
gt7 3 1 14 14 14 2 1 8192 1 64
1 0.0003
0
gzlvl1 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 8000
0
gt9 3 1 14 14 14 2 1 8192 1 64
1 0.000125
0
gzlvl10 1 1 32768 -32768 1 2 1 0 1 64
1 -15000
0
r7 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 0
0
notebook 2 2 8 0 0 2 1 0 1 64
1 ""
0
load 2 2 4 0 0 2 1 3 1 64
1 "n"
2 "y" "n"
in 4 2 1 0 0 2 1 0 1 64
1 "n"
3 "n" "w" "y"
hs 4 2 4 0 0 2 1 0 1 64
1 "nnnn"
2 "n" "y"
gzlvl7 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 4000
0
gzlvl5 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 -6000
0
gzlvl3 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 10000
0
gzlvl2 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 4000
0
gzlvl4 1 1 32768 -32768 1 2 1 0 1 64
1 -7000
0
gzlvl6 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 30000
0
```

```
ho 1 1 500 -500 0 4 1 1 1 64
1 -27.9861111111
0
gzlvl8 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 2000
0
gzlvl9 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 29500
0
homo2 4 2 4 0 0 2 1 0 1 64
1 "n"
2 "n" "y"
homo 2 2 8 0 0 2 1 0 1 64
1 "n"
2 "n" "y"
homo3 4 2 4 0 0 2 1 0 1 64
1 "n"
2 "n" "y"
hzmm 1 1 1000000000 -1000000000 0 4 1 11 1 64
1 23.998607983
0
hst 3 1 0.02 0 2.5e-08 2 1 2 1 64
1 0.01
0
hscuba 3 1 14 14 14 2 1 8192 1 64
1 0.03
0
il 2 2 1 0 0 2 1 0 1 64
1 "n"
2 "y" "n"
is 1 1 1000000000 1e-06 0 4 1 3 1 64
1 1000000000
0
insref 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 0 64
1 1
0
ins2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 100
0
ins 3 1 8190 0 1e-07 4 1 3 1 64
1 100
0
ins2ref 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 0 64
1 1
0
investigator 2 2 8 0 0 2 1 0 1 64
1 ""
0
intmod 2 2 8 0 0 4 1 0 1 64
1 "off"
3 "off" "partial" "full"
io 1 1 500 -500 0.1 4 1 1 1 64
1 10
0
lb2 1 1 100000 -100000 0 3 1 1 0 64
1 0
0
```

```
jxh 7 1 32767 0 0 2 1 0 1 64
1 105
0
jcc 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 75
0
jnh 1 1 10000 80 0 2 1 1024 1 64
1 106
0
lb 1 1 100000 -100000 0 3 1 1 0 64
1 5
0
jxh2 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 94
0
lb1 1 1 100000 -100000 0 3 1 1 0 64
1 0.318309992552
0
llamp 1 1 1000000000 0 0 4 1 0 0 64
200 -4.59109323856e-05 -5.19088607689e-05 -4.7053432354e-05 -5.81574313401e-05 -
5.19840832567e-05 -5.55371480004e-05 -4.04213315051e-05 -4.98456283822e-05 -
5.58155443287e-05 -5.04925847054e-05 -4.31948683399e-05 -5.39735883649e-05 -
5.19470995641e-05 -5.55918377358e-05 -4.98082154081e-05 -5.87051399634e-05 -
4.52509520983e-05 -6.75681585562e-05 4.89473904963e-07 -5.19699970027e-05 -
2.94218007184e-05 -3.88147345802e-05 -2.91328706226e-05 -6.29609421594e-05 -
5.00809728692e-05 -6.77146163071e-05 -6.38160126982e-05 -7.09096857463e-05 -
3.34689066221e-05 -6.18180274614e-05 -3.68875116692e-05 -4.17151532019e-05 -
2.72881752608e-05 -3.60187077604e-05 2.59389489656e-05 -4.47384954896e-05
2.03496692848e-05 -1.918851558e-05 -5.74051318836e-06 -6.3626881456e-05
9.63949132711e-05 5.21112997376e-05 0.000190337683307 0.000276441918686
9.71672634478e-05 0.000668614346068 0.000352685165126 0.000403929530876
0.000406486156862 0.000400811026338 0.00051202083705 5.90048330196e-05
0.000125369871967 5.6045675592e-05 0.000195721484488 0.000586495501921
0.000226417760132 0.00118924141861 0.000177095877007 0.000210481593967
9.40851459745e-05 5.80478408665e-05 0.000169042716152 0.000324096297845
0.000175537803443 0.000141080963658 3.5752873373e-05 0.00100575061515
0.000578368606512 0.000165094563272 0.000141279699164 0.000137800598168
8.40379016154e-06 1.12530606202e-05 -3.27895440932e-06 3.0927509215e-05 -
1.70599105331e-05 -8.41210021463e-06 -1.44544383147e-05 -2.41435354837e-05 -
1.77835827344e-05 -2.28232893278e-05 -5.13579152539e-06 -2.46367108048e-05 -
2.05777068913e-05 -3.80415003747e-05 -1.38831801451e-05 -2.98057329928e-05 -
2.04013631446e-05 -2.93233988486e-05 -2.68420353677e-05 -3.13568452839e-05 -
2.31144804275e-05 -4.10964639741e-05 -3.03998640447e-05 -3.85603998438e-05 -
3.66430067515e-05 -4.40820549557e-05 -2.92319782602e-05 -5.42339148524e-05 -
3.18336860801e-05 -4.89078920509e-05 -3.16614787153e-05 -4.64371987619e-05 -
3.45756561728e-05 -4.65295161121e-05 -4.06016370107e-05 -4.03111916967e-05 -
4.8075151426e-05 -4.44860561402e-05 -5.76606944378e-05 -4.60191586171e-05 -
7.60144830565e-05 -7.12518813089e-05 -5.99354461883e-05 -7.51645711716e-05 -
3.52802089765e-05 -7.59675676818e-05 -0.000122908910271 -8.37808620417e-05 -
0.000199748479645 -0.000225498559303 -0.000299852254102 -0.00137971213553
0.00225383625366 0.000222106522415 0.000117715862871 7.32263506507e-05
6.25418979325e-05 6.92917164997e-05 4.037241888e-05 5.92764699832e-05
2.83369299723e-05 5.82145476073e-05 4.53001048299e-05 5.0560112868e-05
4.75559500046e-05 5.91506395722e-05 2.9575339795e-05 3.60823432857e-05
4.28182902397e-05 9.47616263147e-06 2.82924866042e-05 1.44651085066e-05
1.84351465577e-05 2.99323119179e-06 2.02673272724e-05 1.38856275953e-05
2.39230357693e-05 1.01590594568e-05 7.77770492277e-06 1.63948388945e-05
```

3.4671497815e-06 9.79331070994e-06 -2.66348092737e-06 8.34015736473e-06
1.37623737828e-06 7.18825594959e-06 -1.72181694325e-06 2.76931655208e-06 -
9.34515810513e-06 1.97041913452e-06 -1.55771431309e-06 2.83783629129e-06
7.09729692971e-06 -3.37294500241e-06 8.42990687033e-07 -1.31613546728e-06
2.85011287815e-06 1.95264601643e-06 -2.35224979406e-06 5.34264290764e-06
5.38853953458e-07 3.03897081722e-06 -1.1234566955e-05 4.07221705245e-07
2.5734088922e-05 1.53106557264e-05 5.71191558265e-05 -1.89281618077e-05 -
1.01514087874e-05 -1.1526902199e-05 1.56137411977e-06 -9.10408743948e-06 -
1.6485046217e-06 -1.38697050716e-05 -1.64660582413e-06 -1.30044963953e-05 -
9.72137331701e-06 -1.18258340081e-05 -1.10163100544e-05 -2.02856863325e-05 -
1.28133751787e-06 -1.83538886631e-05 -3.99468035539e-06 -1.01575587905e-05 -
9.91281649476e-06 -1.19286560221e-05 -8.64937078404e-07 -1.60061954375e-05
0
liamp 1 1 1000000000 0 0 4 1 0 0 64
4 0 0 0 0.577882409096
0
lcpeak_ 7 1 32767 0 0 2 1 0 1 64
1 0
0
lifrq 1 1 1000000000 -1000000000 0 4 1 0 0 64
3 7411.29290769 4478.69662387 0
0
llfrq 1 1 1000000000 -1000000000 0 4 1 0 0 64
200 6387.48778104 6368.71945259 6356.20723363 6324.92668622 6312.41446725
6299.90224829 6287.39002933 6268.62170088 6243.59726295 6231.08504399
6206.06060606 6168.52394917 6156.01173021 6143.49951124 6130.98729228
6112.21896383 6074.68230694 6049.65786901 6005.86510264 5974.58455523
5955.81622678 5943.30400782 5924.53567937 5899.51124145 5880.742913 5849.46236559
5836.95014663 5824.43792766 5805.66959922 5786.90127077 5768.13294233
5755.62072336 5736.85239492 5724.34017595 5705.57184751 5668.03519062
5643.01075269 5624.24242424 5611.73020528 5592.96187683 5542.91300098
5524.14467253 5480.35190616 5430.3030303 5380.25415445 5348.97360704
5311.43695015 5286.41251222 5261.38807429 5230.10752688 5192.57086999
5142.52199413 5123.75366569 5104.98533724 5061.19257087 4992.37536657
4911.0459433 4854.74095797 4792.17986315 4742.13098729 4710.85043988
4692.08211144 4673.31378299 4617.00879765 4560.70381232 4498.1427175
4473.11827957 4429.3255132 4391.7888563 4366.76441838 4347.99608993 4316.71554252
4279.17888563 4266.66666667 4254.1544477 4235.38611926 4185.3372434 4160.31280547
4135.28836755 4110.26392962 4097.75171065 4085.23949169 4072.72727273
4053.95894428 4041.44672532 4028.93450635 4010.16617791 3997.65395894
3978.8856305 3953.86119257 3941.34897361 3928.83675464 3916.32453568
3897.55620723 3885.04398827 3866.27565982 3853.76344086 3834.99511241
3809.97067449 3772.4340176 3753.66568915 3741.15347019 3728.64125122
3716.12903226 3703.61681329 3684.84848485 3672.33626588 3653.56793744
3634.79960899 3622.28739003 3591.00684262 3572.23851417 3497.16520039
3472.14076246 3459.6285435 3447.11632454 3428.34799609 3409.57966764
3365.78690127 3334.50635386 3284.45747801 3259.43304008 3234.40860215
3203.12805474 3178.10361681 3096.77419355 3021.70087977 2996.67644184
2984.16422287 2971.65200391 2959.13978495 2940.3714565 2927.85923754
2896.57869013 2859.04203324 2846.52981427 2834.01759531 2815.24926686
2783.96871945 2765.20039101 2746.43206256 2727.66373412 2696.38318671
2671.35874878 2652.59042033 2633.82209189 2615.05376344 2602.54154448
2590.02932551 2571.26099707 2546.23655914 2521.21212121 2508.69990225
2496.18768328 2477.41935484 2464.90713587 2452.39491691 2433.62658847
2402.34604106 2389.83382209 2377.32160313 2339.78494624 2327.27272727
2314.76050831 2289.73607038 2277.22385142 2264.71163245 2252.19941349
2233.43108504 2220.91886608 2202.15053763 2189.63831867 2170.86999022

```
2158.35777126 2127.07722385 2114.56500489 2083.28445748 2070.77223851
2045.74780059 1995.69892473 1983.18670577 1970.6744868 1945.65004888
1926.88172043 1908.11339198 1883.08895406 1864.32062561 1845.55229717
1826.78396872 1814.27174976 1801.75953079 1776.73509286 1745.45454545
1707.91788856 1689.14956012 1670.38123167 1657.86901271 1639.10068426
1614.07624633 1576.53958944
0
lptrace2 7 1 32767 0 1 3 1 0 1 64
1 0
0
lpext1 7 1 1000000 0 1 3 1 0 1 64
1 94
0
lp1 1 1 3600 -3600 0.1 4 1 3 1 64
1 0
0
lockphase_ 1 1 360 0 1 2 1 16 1 64
1 229
0
lockfreq_ 5 1 160 0 1e-07 2 1 9 1 64
1 91.9267
0
loc_ 7 1 12 12 12 2 1 8201 0 64
1 0
0
lockgain_ 1 1 48 0 1 2 1 16 1 64
1 44
0
lockpower_ 1 1 68 0 1 2 1 16 1 64
1 46
0
lp 1 1 3600 -3600 0.1 4 1 3 1 64
1 0
0
lpalg1 2 2 8 0 0 3 1 0 1 64
1 "lpfft"
0
lp2 1 1 3600 -3600 0.1 4 1 3 1 64
1 0
0
lpalg2 2 2 8 0 0 3 1 0 1 64
1 "lpfft"
0
lpnupts1 7 1 1000000 1 1 3 1 0 1 64
1 95
0
lpfilt1 7 1 32767 1 1 3 1 0 1 64
1 8
0
lpext2 7 1 1000000 0 1 3 1 0 1 64
1 23
0
lpfilt2 7 1 32767 1 1 3 1 0 1 64
1 8
0
lpopt2 2 2 8 0 0 3 1 0 1 64
1 "f"
```

```
0
lpopt1 2 2 8 0 0 3 1 0 1 64
1 "f"
0
lpnupts2 7 1 1000000 1 1 3 1 0 1 64
1 41
0
lpprint2 7 1 63 0 1 3 1 0 1 64
1 0
0
lpprint1 7 1 63 0 1 3 1 0 1 64
1 0
0
lptrace1 7 1 32767 0 1 3 1 0 1 64
1 0
0
method 2 2 6 0 0 2 1 3 1 64
1 "/vnmr/shimmethods/z1z2"
0
lvl 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 -0.187809519083
0
lsfrq 1 1 9.99999984307e+17 -9.99999984307e+17 0 3 1 0 0 64
1 0
0
lsfid1 7 1 64000 -64000 1 3 1 0 0 64
1 0
0
lsfid 7 1 64000 -64000 1 3 1 0 0 64
1 0
0
lsfid2 7 1 64000 -64000 1 3 1 0 0 64
1 0
0
lsfrq2 1 1 9.99999984307e+17 -9.99999984307e+17 0 3 1 0 0 64
1 0
0
lsfrq1 1 1 9.99999984307e+17 -9.99999984307e+17 0 3 1 0 1 64
1 -1380
0
math 2 2 1 0 0 3 1 3 1 64
1 "f"
3 "d" "f" "i"
macro 2 2 6 0 0 4 1 3 1 64
1 ""
0
mcyc 7 1 32767 0 0 2 1 0 1 64
1 1
0
n2 2 2 6 0 0 4 1 3 1 64
1 ""
0
mlevpwr 7 1 32767 0 0 2 1 0 1 64
1 50
0
mixnoe 3 1 14 14 14 2 1 8192 1 64
1 0.14
```

```
0
mixmlev 3 1 14 14 14 2 1 8192 1 64
1 0.02
0
mixshift 3 1 14 14 14 2 1 8192 1 64
1 0
0
n1 2 2 6 0 0 4 1 3 1 64
1 ""
0
ni 7 1 32767 0 0 2 1 0 1 64
1 1
0
n3 2 2 6 0 0 4 1 3 1 64
1 ""
0
ni2 7 1 32767 0 1 2 1 0 1 64
1 1
0
presat 3 1 14 14 14 2 1 8192 1 64
1 1.5
0
parversion 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 4 1 64
1 5.1
0
oslsfrq 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 1 0 64
1 0
0
ntype3d 4 2 4 0 0 3 1 0 1 64
1 "nn"
0
np 7 1 524288 32 2 2 1 11 1 64
1 1148
0
nt 7 1 1000000000 1 1 2 1 2 1 64
1 8
0
osfb 1 1 100000 0 0 2 1 1 0 64
1 0
0
oscoef 7 1 49999 3 2 2 1 1 1 64
1 331
0
omega_sl 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 10
0
osfilt 2 2 8 0 0 2 1 0 1 64
1 ""
5 "a" "A" "b" "B" ""
pad 3 1 14 14 14 2 1 8194 1 64
1 0
0
p1 6 1 13 13 13 2 1 8194 1 64
1 0
0
oversamp 7 1 68 0 1 2 1 9 1 64
1 44
```

```
0
paramChanged 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
0
page 2 2 8 0 0 2 1 0 1 64
1 ""
0
parstyle_ 2 2 8 0 0 4 1 0 1 64
1 "ppa"
0
phfid2 1 1 3600 -3600 0.1 3 1 0 0 64
1 0
0
phase2 7 1 4 0 1 2 1 0 1 64
1 1
0
phase 7 1 4 0 1 2 1 0 1 64
1 1
0
path3d 2 2 8 0 0 4 1 0 1 64
1 "/home/george/vnmrsys/exp9/datadir3d"
0
phfid 1 1 3600 -3600 0.1 3 1 0 0 64
1 0
0
phase_sl1 1 1 360 0 0.5 2 1 0 1 64
1 0
0
phfid1 1 1 3600 -3600 0.1 3 1 0 0 64
1 0
0
pmode 2 2 8 0 0 3 1 0 1 64
1 "partial"
0
plane 2 2 8 0 0 4 1 0 1 64
1 "f1f3"
6 "f1f3" "f3f1" "f2f3" "f3f2" "f1f2" "f2f1"
pkpick_ 2 2 8 0 0 4 1 0 1 64
1 ""
0
pltmod 2 2 8 0 0 4 1 0 1 64
1 "off"
5 "off" "fixed" "full" "variable" "user"
preacq 6 1 13 13 13 2 1 8192 0 64
1 0
0
pwca 6 1 13 13 13 2 1 8192 1 64
1 50
0
procdim 7 1 1000000000 -1000000000 0 3 1 0 1 64
1 0
0
proc1 2 2 10 0 0 3 2 1 1 64
1 "ft"
0
probe_ 2 2 8 0 0 2 1 8 1 64
1 "cp329"
```

```
0
priority 7 1 32768 0 1 2 1 0 1 64
1 5
0
proc 2 2 10 0 0 3 1 1 1 64
1 "ft"
0
proc2 2 2 8 0 0 3 1 1 1 64
1 "ft"
0
pw 6 1 13 13 13 2 1 8194 1 64
1 8.2
0
pslabel 2 2 8 0 0 2 1 11 1 64
1 "hncoca_CA_CEST_600_lek"
0
processid 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
0
ptspec3d 4 2 4 0 0 3 1 0 1 64
1 "nnn"
0
pw_sl1 6 1 13 13 13 2 1 8192 1 64
1 0
0
pw90 6 1 13 13 13 2 1 8194 1 64
1 8.2
0
pwc 6 1 13 13 13 2 1 8192 1 64
1 13.7
0
pw_waltz 6 1 13 13 13 2 1 8192 1 64
1 75
0
pwn15 6 1 200 0 0.025 2 1 1024 1 64
1 36.5
0
pwco_sh 2 2 8 0 0 2 1 0 1 64
1 "herm180_17p6_750"
0
pwcadec 6 1 13 13 13 2 1 8192 1 64
1 318
0
pwca90 6 1 13 13 13 2 1 8192 1 64
1 53
0
pwca180 6 1 13 13 13 2 1 8192 1 64
1 48.8
0
pwco90 6 1 13 13 13 2 1 8192 1 64
1 53
0
pwco180 6 1 13 13 13 2 1 8192 1 64
1 48.8
0
pwmlev 6 1 13 13 13 2 1 8192 1 64
1 41.5
```

```
0
pwcod 6 1 13 13 13 2 1 8192 1 64
1 234
0
pwn 6 1 13 13 13 2 1 8192 1 64
1 48
0
pxcodec 6 1 13 13 13 2 1 8192 1 64
1 0
0
pwx1 6 1 13 13 13 2 1 8192 1 64
1 36
0
pwreb_cp 6 1 13 13 13 2 1 8192 1 64
1 454
0
pwx2 6 1 13 13 13 2 1 8192 1 64
1 0
0
r3 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 99.3962666667
0
r2 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 66.6666666667
0
r1 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 48
0
r5 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 0.032
0
r4 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 0.0182848
0
r6 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 0
0
trace 2 2 2 0 0 4 1 3 1 64
1 "f2"
3 "f1" "f2" "f3"
shims 2 2 8 0 0 2 1 0 1 64
1 ""
0
sb 1 1 1000 -1000 0.001 3 1 0 1 64
1 -0.0324645191431
0
rfp 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 0
0
refsource1 2 2 8 0 0 4 1 0 1 64
1 "sfrq"
0
reffrq2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 598.9394307
0
reffrq 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 598.93893025
```

```
0
ref 5 1 1000000000 -1000000000 0 3 1 0 1 64
1 0
0
reffrq1 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 598.9394307
0
refpos1 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 0 64
1 0
0
refpos 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 3.94656900675
0
refpos2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 0 64
1 0
0
rfl1 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 2000
0
rfband 4 2 4 0 0 2 1 0 1 64
1 "cccc"
3 "c" "h" "l"
refsource2 2 2 8 0 0 4 1 0 1 64
1 "sfrq"
0
rfl 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 97520.3545042
0
rfl2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 1000
0
rp2 1 1 3600 -3600 0.1 4 1 3 1 64
1 0
0
rof2 6 1 13 13 13 2 1 8194 1 64
1 2
0
rfp2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 14953.9411609
0
rfp1 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 6785.8220394
0
rof1 6 1 13 13 13 2 1 8194 1 64
1 0
0
rp 1 1 3600 -3600 0.1 4 1 3 1 64
1 -1536.92880274
0
rp1 1 1 3600 -3600 0.1 4 1 3 1 64
1 0
0
satfrq 5 1 1000000000 -1000000000 0 2 1 0 1 64
1 -9970
0
samplename 2 2 8 0 0 2 1 0 1 64
1 ""
```

```
0
sample 2 2 8 0 0 2 1 0 1 64
1 "lysh2o"
0
satflg 2 2 8 0 0 2 1 0 1 64
1 "y"
0
satpwr 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 12
0
saveglobal_ 2 2 8 0 0 3 1 0 1 64
15 "probe"
"lcpeak"
"loc"
"lockpower"
"lockgain"
"lockphase"
"lockfreq"
"z0"
"lkof"
"vloc"
"vrack"
"vzone"
"vproto"
"pkpick"
"parstyle"
0
scf 1 1 1 0 0 2 1 0 1 64
1 0.45
0
sbs1 1 1 1000 -1000 0.001 3 1 1 1 64
1 0
0
sb2 1 1 1000 -1000 0.001 3 1 1 0 64
1 0.031
0
sb1 1 1 1000 -1000 0.001 3 1 1 1 64
1 0
0
sbs 1 1 1000 -1000 0.001 3 1 1 1 64
1 -0.032
0
sc 1 1 1 1 1 4 1 8195 1 64
1 223.888888889
0
sbs2 1 1 1000 -1000 0.001 3 1 1 0 64
1 -0.031
0
sc2 1 1 3 3 3 4 1 8195 1 64
1 0
0
sf2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0
0
sf 1 1 8190 0 1e-07 4 1 3 1 64
1 0
0
```

```
seqfil 2 2 8 0 0 2 1 11 1 64
1 "hncoca_CA_CEST_600_lek"
0
sf1 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0
0
sh_cpmg 2 2 8 0 0 2 1 0 1 64
1 "co_ca"
0
sfrq 1 1 1000000000 0 0 2 1 11 1 64
1 598.8055145
0
shape 2 2 8 0 0 2 1 0 1 64
1 "herm180_trc"
0
taua 3 1 14 14 14 2 1 8192 1 64
1 0.0023
0
ssfilter 1 1 50000 10 0.1 3 1 0 1 64
1 200
0
sp1 1 1 1000000000 -1000000000 0 4 1 3 1 64
1 4785.8220394
0
solvent 2 2 6 0 0 2 1 11 1 64
1 "d2o"
0
shp_sl1 2 2 8 0 0 2 1 0 1 64
1 "hard"
0
shp_sl 2 2 8 0 0 2 1 0 1 64
1 "hard"
0
sn 1 1 1e+18 -1e+18 0 3 1 1 1 64
1 0
0
solvfactor 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 -3.3e-07
0
sp 1 1 1000000000 -1000000000 0 4 1 3 1 64
1 -97518.1550391
0
spin 1 1 32000000 0 0.1 2 1 0 0 64
1 0
0
spca180 2 2 8 0 0 2 1 0 1 64
1 "hard_-118p"
0
sp2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 13953.9411609
0
specdc3d 4 2 4 0 0 3 1 0 1 64
1 "nnn"
0
sphase1 1 1 360 0 0.5 2 1 0 1 64
1 0
0
```

```
ss 7 1 32767 -32768 0 2 1 0 1 64
1 4
0
ss3d 2 2 8 0 0 3 1 0 1 64
1 ""
3 "" "lfs" "zfs"
strtext1 7 1 1000000 1 1 3 1 0 1 64
1 96
0
ssorder 7 1 20 1 1 3 1 0 0 64
1 7
0
ssntaps 7 1 2500 0 1 3 1 0 1 64
1 199
0
sspul 2 2 8 0 0 2 1 0 1 64
1 "n"
0
sw 1 1 5 5 5 2 1 8203 1 64
1 9000.90009001
0
strtlp1 7 1 1000000 1 1 3 1 0 1 64
1 95
0
strtext2 7 1 1000000 1 1 3 1 0 1 64
1 42
0
strtlp2 7 1 1000000 1 1 3 1 0 1 64
1 41
0
sw2 5 1 5000000 1 -1.25e-08 2 1 0 1 64
1 1619.99068505
0
sw1 1 1 5000000 1 -2.5e-08 2 1 0 1 64
1 1499.98125023
0
tau_eq 3 1 14 14 14 2 1 8192 1 64
1 0.003
0
time_processed 2 2 8 0 0 3 1 0 1 64
1 ""
0
th2d 1 1 1 1e-18 0 4 1 17 1 64
1 0.8
0
temp 1 1 200 -150 0.1 2 1 8 1 64
1 15
0
tauf 3 1 14 14 14 2 1 8192 1 64
1 0.0023
0
taub 3 1 14 14 14 2 1 8192 1 64
1 0.004
0
th 1 1 1000000000 0 0 4 1 1 1 64
1 92.7272720337
0
```

```
time_complete 2 2 8 0 0 2 1 0 1 64
1 "20080408T100107"
0
time_plotted 2 2 8 0 0 3 1 0 1 64
1 ""
0
tin 2 2 1 0 0 2 1 2 1 64
1 "n"
3 "n" "w" "y"
time_submitted 2 2 8 0 0 2 1 0 1 64
1 "20080407T183931"
0
time_saved 2 2 8 0 0 2 1 0 1 64
1 "20140218T120136"
0
time_run 2 2 8 0 0 2 1 0 1 64
1 "20080407T183951"
0
time_sl 3 1 0.5 0 0 2 1 0 1 64
1 0.3
0
time_sl_max 3 1 14 14 14 2 1 8192 1 64
1 0.3
0
time_submitted_local 2 2 8 0 0 2 1 0 1 64
1 "20080407T183931X06PMMonApr"
0
time_svfdate 2 2 8 0 0 2 1 0 1 64
1 "20080407T183931"
0
tof 5 1 7 7 7 2 1 8202 1 64
1 -1568
0
tn 2 2 4 0 0 2 1 8 1 64
1 "H1"
0
tlt 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 0.00134074070957
0
tnsat 4 2 4 0 0 2 1 0 1 64
1 "y"
0
tpwrml 1 1 17 17 17 2 1 8192 1 64
1 49
0
tpwr 7 1 17 17 17 2 1 8194 1 64
1 63
0
tpwr_waltz 1 1 17 17 17 2 1 8192 1 64
1 46
0
tpwrsl1 1 1 17 17 17 2 1 8192 1 64
1 -16
0
yz2 7 1 2047 -2048 1 2 1 3 1 64
1 10762
0
```

```
wshim 4 2 4 0 0 2 1 1 1 64
1 "n"
15 "e" "f" "g" "n" "s" "0" "1" "2" "3" "4" "5" "6" "7" "8" "9"
vtwait 3 1 14 14 14 2 1 8194 1 64
1 1
0
vpf 1 1 500 -500 0 4 1 0 1 64
1 10
0
vf 1 1 1000000000 0 0 4 1 3 1 64
1 1506.84709198
0
tsatpwr 1 1 17 17 17 2 1 8192 1 64
1 -16
0
trim 3 1 14 14 14 2 1 8192 1 64
1 0.0005
0
username 2 2 8 0 0 2 1 0 1 64
1 "guest"
0
vo 1 1 500 -500 0 4 1 1 1 64
1 0
0
vloc_ 2 2 8 0 0 2 1 8 1 64
1 "A0"
0
vp 7 1 500 -500 0.1 4 1 3 1 64
1 0
0
vs 1 1 1000000000 1e-06 0 4 1 3 1 64
1 329055.012196
0
vproto_ 2 2 8 0 0 2 1 0 1 64
1 ""
0
vpfi 1 1 500 -500 0 4 1 0 1 64
1 0
0
vrack_ 7 1 5 1 0 2 1 0 1 64
1 1
0
vsproj 1 1 1000000000 1e-06 0 4 1 3 1 64
1 298000
0
vs2d 1 1 1000000000 1e-06 0 4 1 3 1 64
1 482253086.42
0
vtc 1 1 255 0 1 2 1 2 1 64
1 10
0
wf 1 1 8190 0 1e-07 4 1 3 1 64
1 0.063936
0
wc2 1 1 4 4 4 4 1 8195 1 64
1 155
0
```

```
wbs 2 2 6 0 0 3 1 3 1 64
1 ""
0
vzone_ 7 1 15 1 0 2 1 0 1 64
1 1
0
wc 1 1 2 2 2 4 1 8203 1 64
1 26.1111111111
0
werr 2 2 6 0 0 3 1 3 1 64
1 ""
0
wdone 2 2 8 0 0 3 1 0 1 64
1 "acqdone"
0
wexp 2 2 6 0 0 3 1 3 1 64
1 "tm_dnr"
0
wnt 2 2 6 0 0 3 1 3 1 64
1 ""
0
wf2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0.0395064000001
0
wf1 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 64
0
wp1 1 1 100000 0 0 4 1 3 1 64
1 1
0
wp 1 1 5000000 0 0 4 1 11 1 64
1 9006.80954392
0
wp2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 1619.99068505
0
xdiag 1 1 1e+18 0 0 4 1 17 1 64
1 0
0
x1 7 1 2047 -2048 1 2 1 3 1 64
1 -1542
0
wtfile1 2 2 15 0 0 3 2 1 1 64
1 ""
0
wtfile 2 2 15 0 0 3 1 1 1 64
1 ""
0
wtfile2 2 2 8 0 0 3 1 1 1 64
1 ""
0
x3 7 1 2047 -2048 1 2 1 3 1 64
1 7390
0
x2y2 7 1 2047 -2048 1 2 1 3 1 64
1 -3095
0
```

```
x4 7 1 19 19 19 2 1 8192 1 64
1 -4086
0
y1 7 1 2047 -2048 1 2 1 3 1 64
1 1531
0
xz 7 1 2047 -2048 1 2 1 3 1 64
1 -1243
0
xy 7 1 2047 -2048 1 2 1 3 1 64
1 1648
0
xz2 7 1 2047 -2048 1 2 1 3 1 64
1 1201
0
y4 7 1 19 19 19 2 1 8192 1 64
1 -1554
0
y3 7 1 2047 -2048 1 2 1 3 1 64
1 3707
0
yz 7 1 2047 -2048 1 2 1 3 1 64
1 -2636
0
z3y 7 1 19 19 19 2 1 8192 1 64
1 -8758
0
z2xy 7 1 19 19 19 2 1 8192 1 64
1 -5085
0
z2 7 1 2047 -2048 1 2 1 2 1 64
1 -3429
0
z1 7 1 2047 -2048 1 2 1 2 1 64
1 7120
0
z0_ 1 1 19 19 19 2 1 8208 1 64
1 -4156
0
z1c 7 1 2047 -2048 1 2 1 2 1 64
1 0
0
z2x2y2 7 1 19 19 19 2 1 8192 1 64
1 -7822
0
z2c 7 1 2047 -2048 1 2 1 2 1 64
1 0
0
z2x3 7 1 19 19 19 2 1 8192 1 64
1 3830
0
z3x 7 1 19 19 19 2 1 8192 1 64
1 4724
0
z3 7 1 2047 -2048 1 2 1 2 1 64
1 -2076
0
```

```
z2y3 7 1 19 19 19 2 1 8192 1 64
1 1190
0
z3c 7 1 19 19 19 2 1 8192 1 64
1 0
0
z3x3 7 1 19 19 19 2 1 8192 1 64
1 -444
0
z3x2y2 7 1 19 19 19 2 1 8192 1 64
1 -1296
0
z3xy 7 1 19 19 19 2 1 8192 1 64
1 -2772
0
z5 7 1 2047 -2048 1 2 1 3 1 64
1 18313
0
z4x 7 1 19 19 19 2 1 8192 1 64
1 749
0
z4 7 1 2047 -2048 1 2 1 2 1 64
1 5452
0
z3y3 7 1 19 19 19 2 1 8192 1 64
1 -1994
0
z4c 7 1 19 19 19 2 1 8192 1 64
1 0
0
z4xy 7 1 19 19 19 2 1 8192 1 64
1 884
0
z4x2y2 7 1 19 19 19 2 1 8192 1 64
1 -3010
0
z4y 7 1 19 19 19 2 1 8192 1 64
1 -340
0
z7 7 1 19 19 19 2 1 8192 1 64
1 0
0
z5y 7 1 19 19 19 2 1 8192 1 64
1 5203
0
z5x 7 1 19 19 19 2 1 8192 1 64
1 -2219
0
z6 7 1 19 19 19 2 1 8192 1 64
1 -23672
0
zx2y2 7 1 2047 -2048 1 2 1 3 1 64
1 267
0
z8 7 1 19 19 19 2 1 8192 1 64
1 0
0
```

```
zxy 7 1 2047 -2048 1 2 1 3 1 64
1 12681
0
zx3 7 1 19 19 19 2 1 8192 1 64
1 569
0
zy3 7 1 19 19 19 2 1 8192 1 64
1 2296
0
```