

Varian Gly CPMG Pulse Sequences and procpar files:

CaHD_cpmg_GLY_dfh_600_v1.c	C α CPMG sequence from the paper
CaHD_cpmg_GLY_dfh_600_v2.c	C α CPMG sequence with the HETCP replaced by a reverse INEPT
Ha_SQ_exchange_lek_600_GLY.c	H α CPMG sequence from the paper

```
/* CaHD_cpmg_GLY_dfh_600_v1.c
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```
This pulse sequence will allow t2 to perform the following experiment:
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2D C13,1H correlation map to observe exchange with variable CPMG spacing
exchange is quantified in the Ca positions of GLY where labeled with
50%D, i.e., we quantify the dispersion at the CHD position, while suppressing
CH2.
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Uses two channels:
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1) 1H          - 4.73 ppm
2) 13C         - 43.9 ppm (so we can suppress the Cb from other residues).
3) 15C         - 119 ppm
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```
Set dm = 'nnny', dmm = 'cccp' [13C decoupling during acquisition].
Set dm2 = 'nnnn', dmm2 = 'cccp'.
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```
Must set phase = 1,2 for States-TPPI acquisition in t1 [13C].
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in this sequence the deuterium decoupling is performed as a series of
pi pulses (not covering the carbon pulse).
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Proton Pulses:
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Sit on the HDO signal at 4.774ppm
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pw      @ tpwr      : Hard pulse - max power
pw_dip  @ t_dip     : Power for hetCP DIPSI-2 transfer (around 33 us)
pws1    @ tpwrs1    : SpinLock power during carbon CPMG.;
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Carbon Pulses:
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```
Sit at 43.9 ppm with the carrier.
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```
pwc      @ dhpwr     : high power 13C 90 pulse at dhpwr
pwc_cp   @ dpwr_cp   : pulse width of the 90s immediately flanking the CPMG period.
pwc_ca   @ d_ca      : Selective (Ca && !CO) pulses. Phase can be adjusted with phase_ca.
                        Use the RF_CO_Ca_burp_600_v3 program
pwc_reb  @ d_reb     : A selective Re-burp pulse (Ca(gly) && !Cb(!gly))
                        shape is shp_reb. Maximum length is 2.750 ms.
1./dmf   @ dpwr      : Decoupling during Acquisition
1./dmf_co @ dpwrcodec : Decoupling during indirect acquisition
                        Pattern 'codecsq' should be a low power adiabatic decoupling,
                        e.g. a WURST-2 sequence.
ncyc can be either even or odd :)
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Deuterium Pulses:
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Sit in the middle of the Glycine region (4.0)ppm
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pwd: Low power decoupling - around 350us
pwd1: High power deuterium pulses.
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Delays
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taua: set to slightly less than 1/4J
taub: set to exactly 1/4J
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Written D. F. Hansen on August 12 2008.
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```
Modified on Aug 15 2008 by DF Hansen,
Only decouple 2H between the carbon pulses
```

```
Modified on Aug 16th 2008 by DF Hansen,
Select a decoupling pattern for 2H that is optimum for the tauCPMG
delay.
One must have 'CW.DEC', 'Composite.DEC', 'WALTZ-1.DEC', and 'WALTZ-4.DEC'
```

```
Modified on Aug 21 2008 by DF Hansen,
changed phase cycle (t10).
```

```
*/
```

```
#include <standard.h>
```

```
static int phil[2] = {1,3},          /* Carbon excitation */
```

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phi2[4] = {1,1,3,3},          /* Initial proton cp */
phi3[4] = {3,3,1,1},          /* -- do -- */
phi4[8] = {1,1,3,3,3,3,1,1}, /* Initial carbon */
phi5[8] = {3,3,1,1,1,1,3,3}, /* -- do -- */
phi6[16] = {0,0,0,0,0,0,0,2,2,2,2,2,2,2,2,2}, /* 180x in middle of CPMG */
phi8[1] = {0},
phi10[8] = {0,0,0,0,2,2,2,2},
phi11[2] = {1,1},
phi12[16] = {1,1,1,1,1,1,1,3,3,3,3,3,3,3,3,3},
rec[8] = {0,2,2,0,0,2,2,0};

static double d2_init=0.0;

pulsesequance() {
/* DECLARE VARIABLES */

char      fsat[MAXSTR],
          fscuba[MAXSTR],
          fl180[MAXSTR], /* Flag to start t1 @ halfdwell */
          shp_ca[MAXSTR], /* CPMG pulse */
          shp_reb[MAXSTR],
          codecseq[MAXSTR],
          opt_water[MAXSTR],
          dec3pat[MAXSTR];

int        phase,
          t1_counter, /* used for states tppi in t1 */
          ncyc_dipfinal,
          rec_phase;

double     tau1, /* t1 delay */
          taua, /* set to approx. 1/4JCH */
          taub, /* set to exactly 1/4JCH */
          pwc, /* 90 c pulse at dhpwr */
          tsatpwr, /* low level 1H trans.power for presat */
          dhpwr, /* power level for high power 13C pulses on dec1 */
          sw1, /* sweep width in f1 */

          dpwr_cp, /* power level for 13C CPMG */
          pwc_cp, /* 13C pw for CPMG */

          ncyc, /* number of CPMG cycles */
          ncycmax,
          time_T2, /* total time for CPMG trains */
          tauCPMG,

          dhpwr2,
          pwn,

          p10,p11,p12,p13,p14,p15,p16,p17,p18,
          pw_dip,
          p_d,

          dpwr_dip,
          t_dip,

          /* Deuterium Decoupling during CPMG train */
          dpwr3_D, /* power level for deuterium decoupling */
          dpwr3_f, /* Fine power adjustment of the deuterium decoupling */
          pwd, /* pw90 D for decoupling */
          pwd1, /* Hi power D 90 */

          /* 180 pulse in the CPMG */
          pwc_ca,
          d_ca,
          phase_ca,

          /* Re-burp on Glycine */
          pwc_reb,
          d_reb,

          /* Carbonyl decoupling during indirect acquisition */
          dmf_co,

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dresco,
dpwrcodec,

/* Decoupling on protons during CPMG */
pws1,
pws1_f,
pws1_ffst,
tpwrs1,
tpwrs1_ffst=0.,
tpwrs1_f=0.,
numpulse, numpulsefst,

numD,D_delay,numD_f,D_delay_f,

time_equil,

gt0,
gt1,
gt2,
gt3,

gzlv10,
gzlv11,
gzlv12,
gzlv13;

/* LOAD VARIABLES */
getstr("opt_water",opt_water);
getstr("fsat",fsat);
getstr("f1180",f1180);
getstr("fscuba",fscuba);

getstr("shp_ca",shp_ca);

getstr("codecseq",codecseq);
getstr("shp_reb",shp_reb);

taua = getval("taua");
taub = getval("taub");
pwc = getval("pwc");
tpwr = getval("tpwr");
tsatpwr = getval("tsatpwr");

dhpwr = getval("dhpwr");
dpwr = getval("dpwr");

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

dpwr_cp = getval("dpwr_cp");
pwc_cp = getval("pwc_cp");
ncyc = getval("ncyc");
time_T2 = getval("time_T2");

pwc_reb = getval("pwc_reb");
d_reb = getval("d_reb");

dhpwr2 = getval("dhpwr2");
pwn = getval("pwn");

ncyc_dipfinal = getval("ncyc_dipfinal");
dpwr_dip = getval("dpwr_dip");
t_dip = getval("t_dip");
pw_dip = getval("pw_dip");
rec_phase= (int)(getval("rec_phase")+0.5);

dpwr3_D = getval("dpwr3_D");
dpwr3_f = 0.;
pwd = getval("pwd");
pwd1 = getval("pwd1");

pwc_ca = getval("pwc_ca");
d_ca = getval("d_ca");

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phase_ca = getval("phase_ca");

dmf_co = getval("dmf_co");
dresco = getval("dresco");
dpwrcodec = getval("dpwrcodec");

/* SpinLock decoupling during the CPMG train */
pws1 = getval("pws1");
tpwrs1 = getval("tpwrs1");

/* Equilibrium time before and after CPMG */
time_equil=getval("time_equil");

p_d = (50.0/90.0)*pw_dip;

p10 = 4.9*p_d;
p11 = 7.9*p_d;
p12 = 5.0*p_d;
p13 = 5.5*p_d;
p14 = 0.6*p_d;
p15 = 4.6*p_d;
p16 = 7.2*p_d;
p17 = 4.9*p_d;
p18 = 7.4*p_d;

gt0 = getval("gt0");
gt1 = getval("gt1");
gt2 = getval("gt2");
gt3 = getval("gt3");

gzlvl0 = getval("gzlvl0");
gzlvl1 = getval("gzlvl1");
gzlvl2 = getval("gzlvl2");
gzlvl3 = getval("gzlvl3");

/* LOAD PHASE TABLE */

settable(t1,2,phi1);
settable(t2,4,phi2);
settable(t3,4,phi3);
settable(t4,8,phi4);
settable(t5,8,phi5);
settable(t6,16,phi6);
settable(t7,8,rec);
settable(t8,1,phi8);
settable(t10,8,phi10);

settable(t11,2,phi11);
settable(t12,16,phi12);

/* CHECK VALIDITY OF PARAMETER RANGES */
if ( sfrq > 750. ){
    printf(" You should change the probe. Don't use this sequence at 800MHz\n");
    abort(1);
};

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' || dm2[D] == 'y')) {
    printf("incorrect dec2 decoupler flags! ");
    abort(1);
};
if( tsatpwr > 6 ) {
    printf("TSATPWR too large !!! ");
    abort(1);
};
if( dpwr > 48 ) {
    printf("don't fry the probe, DPWR too large! ");
    abort(1);
};
if(dpwr_cp > 61) {

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    printf("don't fry the probe, dpwr_cp too large: < 61!  ");
    abort(1);
};
if( dpwr2 > -16 ) {
    printf("don't fry the probe, DPWR2 too large!  ");
    abort(1);
};
if( pw > 20.0e-6 ) {
    printf("dont fry the probe, pw too high ! ");
    abort(1);
};
if(ncyc > 40) {
    printf("ncyc_cp is too large; must be less than 41\n");
    abort(1);
};
if(time_T2 > 0.040) {
    printf("time_T2 is too large; must be less than 40 ms\n");
    abort(1);
};

ncycmax = time_T2/1e-3;
if ( ncyc > ncycmax ) {
    printf(" Maximum of ncyc is exceeded \n");
    printf(" ncyc < time_T2*1000 = %.0f \n",ncycmax);
    abort(1);
};
if(ncyc > 0) {
    tauCPMG = time_T2/(4.0*ncyc) - pwc_ca/2.;
    if(ix==1) {
        printf("nuCPMG for current experiment is (Hz): %5.3f\n",1/(4.0*(tauCPMG+pwc_ca/2.)));
    };
} else {
    tauCPMG = time_T2/(4.0) - pwc_ca/2.;
    if(ix==1) {
        printf("nuCPMG for current experiment is (Hz): not applicable\n");
    };
};
if(tauCPMG - (2.0/PI)*pwc_cp - WFG_START_DELAY < 5e-6) {
    printf("tauCPMG is too small; decrease ncyc_cp\n");
    abort(1);
};
if(tpwrs1 > 57) {
    printf("tpwrs1 < 58\n");
    abort(1);
};
if(dpwr_dip > 56) {
    printf("dpwr_dip < 57\n");
    abort(1);
};
if(ix==1) {
    printf("transfer_bk time is %f\n",28.78*4*pw_dip*ncyc_dipfinal);
};
if(ncyc_dipfinal > 2) {
    printf("ncyc_dipfinal is too big; < 3\n");
    abort(1);
};
if(t_dip > 55) {
    printf("t_dip is too high; < 56\n");
    abort(1);
};
if(pwc_ca > 200e-6 && d_ca > 55 && shp_ca[A]=='h'){
    printf(" Too much power for CPMG-symmetric inversion pulse: (pwc_ca,d_ca)\n");
    abort(1);
};
if(d_reb > 55 ){
    printf(" d_reb is too large; d_reb < 55dB \n");
    abort(1);
};
if ( pwc_reb > 2.755e-3 ){
    printf(" pwc_reb is too long; pwc_reb<2.75ms\n");
    abort(1);
};
if(pwc_ca > 2e-3 ) {

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    printf(" pwc_ca is too long! \n");
    abort(1);
};
if( d_ca > 61 ){
    printf(" d_ca too high! \n");
    abort(1);
};
if(dpwr3_D > 51) {
    printf("Deuterium decoupling power is too high; <= 50\n");
    abort(1);
}
if(dpwr3 > 59) {
    printf("Deuterium pulse power is too high; <= 59\n");
    abort(1);
}
if(pwd>500e-6){
    printf(" Please calibrate the deuterium decoupling to pwd slightly less than 500us\n");
    abort(1);
};

/* Calculate the CW proton decoupling (during CPMG) */
numpulsefst=floor((tauCPMG - (2/PI)*pwc_cp - 2.0e-6 - POWER_DELAY)/(2.0*pwsl));
numpulse=floor((tauCPMG+pwc_ca/2.)/(2.0*pwsl));

/* Calculate the corresponding 90 pulse widths */
pws1_ffst=(tauCPMG - (2/PI)*pwc_cp - 2.0e-6 - POWER_DELAY)/(2.0*numpulsefst);
pws1_f=(tauCPMG+pwc_ca/2.)/(2.0*numpulse);

/* Calculate the corresponding powers */
tpwrs1_ffst=4095.0*pws1/pws1_ffst;
tpwrs1_f=4095.0*pws1/pws1_f;

if(ix == 1){
    printf("numpulsefst %5.0f, pws1_ffst %4.2fus, tpwrs1_ffst
%8.2f\n",numpulsefst,pws1_ffst*1e6,tpwrs1_ffst);
    printf("numpulses %5.0f, pws1_f %4.2fus, tpwrs1_f
%8.2f\n",numpulse,pws1_f*1e6,tpwrs1_f);
};

/* Calculate the CW Deuterium decoupling during CPMG */
/* see how many pi pulses we can fit into tauCPMG */
numD =floor(tauCPMG/(2.*pwd));
numD_f=floor( (tauCPMG-2.*pwc_cp/PI-2.e-6-POWER_DELAY)/(2*pwd));

D_delay =(tauCPMG-2.*numD*pwd)/2.;
D_delay_f=(tauCPMG-2.*pwc_cp/PI-2.e-6-POWER_DELAY - 2.*numD_f*pwd )/2.;

if(ncyc<0){
    numD=floor((time_T2/2.-2.*pwc_cp/PI)/(2.*pwd));
    D_delay=(time_T2/2.-2*pwc_cp/PI-2.*numD*pwd)/2.;
};

/* Now select the best decoupling pattern we can fit in */
if(numD<2){
    strcpy(dec3pat,"CW");
};
if ( numD>1 ){ /* 90x-180y-90x */
    strcpy(dec3pat,"Composite");
};
if ( numD>2 ){ /* 90x-180-x 270x */
    strcpy(dec3pat,"WALTZ-1");
};
if ( numD>12){
    strcpy(dec3pat,"WALTZ-4");
};

/* Phase incrementation for hypercomplex 2D data */
if(phase == 2) {
    tsadd(t1,1,4);
    tsadd(t11,1,4);
};
/* Set up f1180 taul = t1 */
taul = d2;

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if(f1180[A] == 'y') {
    tau1 += ( 1.0 / (2.0*sw1)) - 2.0*pwn - 2.0e-6;
    if(tau1 < 0.4e-6) {
        tau1 = 0.4e-6;
    };
} else {
    if(tau1>2*pwn){
        tau1=tau1-2*pwn;
    }
};
tau1 = tau1/2.0;

/* Calculate modifications to phases for States-TPPI acquisition */
if (ix == 1) {
    d2_init = d2 ;
};
t1_counter = (int) ( (d2-d2_init)*sw1 + 0.5 );

/* TPPI moves artifacts to the edge of the spectrum */
if(t1_counter % 2) {
    tsadd(t8,2,4);
    tsadd(t7,2,4);
};

/* BEGIN ACTUAL PULSE SEQUENCE */
status(A);

/* if ncyc == 0 apply 1H saturation at tpwrs1, tpwrs1_f for time_T2 */

obspower(tpwrs1);
rgpulse(pws1,one,0.,0.);
txphase(zero);
obspwrf(tpwrs1_f);

obsunblank();
xmtron();
if(ncyc==0) {
    delay(time_T2);
};
delay(ni/sw1-d2);

xmtoff();
obsblank();

obspwrf(4095.0);
rgpulse(pws1,three,0.,0.);
obspower(tpwrs1);
txphase(zero);

obspower(tsatpwr);      /* Set transmitter power for 1H presaturation */
decpower(dhpwr);       /* Set Dec1 power for 13C high power pulses */
dec2power(dhpwr2);     /* Set Dec2 power for 15N hard pulses */
dec3power(dpwr3);      /* Set Dec3 power for 2D decoupling */

/* 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);
};

```



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};

obspower(tpwr);          /* Set transmitter power for hard 1H pulses */
txphase(zero);
dec2phase(zero);
decphase(zero);
delay(1.0e-5);

/* BEGIN ACTUAL SEQUENCE */
status(C);

/* Let the purge element phase-cycle together with initial DIPSI
   proton phase */
/* hlv(ct,v3); */
hlv(ct,v2);
mod2(v2,v1);

/* Turn receiver off and hold the lock */
rcvroff();
lk_hold();
delay(20.0e-6);

rgpulse(pw,zero,0.0,0.0);

obspower(t_dip);
decpower(dpwr_dip);

/* het-cp DISPI2 transfer from 1H to 13C */
p10 = 6.4*p_d;
p11 = 8.2*p_d;
p12 = 5.8*p_d;
p13 = 5.7*p_d;
p14 = 0.6*p_d;
p15 = 4.9*p_d;
p16 = 7.5*p_d;
p17 = 5.3*p_d;
p18 = 7.4*p_d;

initval(ncyc_dipfinal,v7);

if(ncyc_dipfinal > 0) {
    starthardloop(v7);

    simpulse(p10,p10,t2,t4,0.0,0.0);
    simpulse(p11,p11,t3,t5,0.0,0.0);
    simpulse(p12,p12,t2,t4,0.0,0.0);
    simpulse(p13,p13,t3,t5,0.0,0.0);
    simpulse(p14,p14,t2,t4,0.0,0.0);
    simpulse(p15,p15,t3,t5,0.0,0.0);
    simpulse(p16,p16,t2,t4,0.0,0.0);
    simpulse(p17,p17,t3,t5,0.0,0.0);
    simpulse(p18,p18,t2,t4,0.0,0.0);

    simpulse(p10,p10,t3,t5,0.0,0.0);
    simpulse(p11,p11,t2,t4,0.0,0.0);
    simpulse(p12,p12,t3,t5,0.0,0.0);
    simpulse(p13,p13,t2,t4,0.0,0.0);
    simpulse(p14,p14,t3,t5,0.0,0.0);
    simpulse(p15,p15,t2,t4,0.0,0.0);
    simpulse(p16,p16,t3,t5,0.0,0.0);
    simpulse(p17,p17,t2,t4,0.0,0.0);
    simpulse(p18,p18,t3,t5,0.0,0.0);

    simpulse(p10,p10,t3,t5,0.0,0.0);
    simpulse(p11,p11,t2,t4,0.0,0.0);
    simpulse(p12,p12,t3,t5,0.0,0.0);
    simpulse(p13,p13,t2,t4,0.0,0.0);
    simpulse(p14,p14,t3,t5,0.0,0.0);
    simpulse(p15,p15,t2,t4,0.0,0.0);
    simpulse(p16,p16,t3,t5,0.0,0.0);
    simpulse(p17,p17,t2,t4,0.0,0.0);
    simpulse(p18,p18,t3,t5,0.0,0.0);

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    simpulse(p10,p10,t2,t4,0.0,0.0);
    simpulse(p11,p11,t3,t5,0.0,0.0);
    simpulse(p12,p12,t2,t4,0.0,0.0);
    simpulse(p13,p13,t3,t5,0.0,0.0);
    simpulse(p14,p14,t2,t4,0.0,0.0);
    simpulse(p15,p15,t3,t5,0.0,0.0);
    simpulse(p16,p16,t2,t4,0.0,0.0);
    simpulse(p17,p17,t3,t5,0.0,0.0);
    simpulse(p18,p18,t2,t4,0.0,0.0);

    endhardloop();
};
decpower(dhpwr);
obspower(tpwrs1-3.);
txphase(zero);

decrgpulse(pwc,zero,0.,0.);

delay(2.0e-6);
rgradient('z',gzlv13);
delay(gt3);
rgradient('z',0.0);
delay(200.0e-6);

txphase(one);
xmtron();
delay(time_equil/2.);
xmtroff();
txphase(zero);
xmtron();
delay(time_equil/2.);
xmtroff();

obspower(tpwrs1); /* lower power */
obspwrf(tpwrs1_ffst); /* Set fine power for the last tcpmg delay */

rlpower(dpwr_cp,DODEV);
decrgpulse(pwc_cp,t10,0.,0.);
decphase(one);
decpower(d_ca);

dec3power(dpwr3_D);

/* CPMG BEGIN */
if(ncyc<0){
    txphase(zero);
    xmtron();

    delay(D_delay);
    dec3phase(zero);
    dec3unblank();
    dec3prgon(dec3pat,pwd,90.);
    dec3on();
    delay(time_T2/2.-2*pwc_cp/PI-2*D_delay);
    dec3off();
    dec3prgoff();
    dec3blank();
    delay(D_delay);
};
if (ncyc > 0) {

    txphase(zero);
    xmtron();
    dec3phase(zero);

    delay(D_delay_f);

    dec3unblank();
    dec3prgon(dec3pat,pwd,90.);
    dec3on();
    delay(tauCPMG - (2/PI)*pwc_cp - 2.0e-6-POWER_DELAY - 2.*D_delay_f );
    dec3off();

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dec3prgoff();
dec3blank();
delay(D_delay_f-WFG_START_DELAY);

xmtrf();
obspwrf(tpwrs1_f);

xmtron();
decshaped_pulse(shp_ca,pwc_ca,one,0.,0.);

delay(D_delay-WFG_STOP_DELAY);
dec3unblank();
dec3prgon(dec3pat,pwd,90.);
dec3on();
    delay(tauCPMG-2.*D_delay);
dec3off();
dec3prgoff();
dec3blank();
delay(D_delay);

};

if(ncyc > 1) {
    initval((ncyc-1),v4);
    loop(v4,v5);

    delay(D_delay);
    dec3unblank();
    dec3prgon(dec3pat,pwd,90.);
    dec3on();
        delay(tauCPMG-2.*D_delay);
    dec3off();
    dec3prgoff();
    dec3blank();
    delay(D_delay-WFG_START_DELAY);

    decshaped_pulse(shp_ca,pwc_ca,one,0.,0.);

    delay(D_delay-WFG_STOP_DELAY);
    dec3unblank();
    dec3prgon(dec3pat,pwd,90.);
    dec3on();
        delay(tauCPMG-2.*D_delay);
    dec3off();
    dec3prgoff();
    dec3blank();
    delay(D_delay);

    endloop(v5);
};
/* CPMG END */

/* Inversion pulse ( off-resonance effects etc. ) */
/* BEGIN */
if (ncyc!=0){
    xmtrf();

    rlpower(d_ca,DODEV);
    decphase(t6);

    initval(1.0,v3);
    decstepsize(phase_ca);
    dcplrphase(v3);

    delay(WFG_STOP_DELAY);
    decshaped_pulse(shp_ca,pwc_ca,t6,0.,0.);
    delay(WFG_START_DELAY);

    dcplrphase(zero);

    rlpower(dpwr_cp,DODEV);

    decphase(one);

```

```

txphase(zero);
delay(0.5e-6);
xmtron();
} else {

rlpower(d_ca,DODEV);
decphase(t6);

initval(1.0,v3);
decstepsize(phase_ca);
dcplrphase(v3);

delay(WFG_STOP_DELAY+0.5e-6);
decshaped_pulse(shp_ca,pwc_ca,t6,0.,0.);
delay(WFG_START_DELAY);

dcplrphase(zero);

rlpower(dpwr_cp,DODEV);

decphase(one);
txphase(zero);
delay(0.5e-6);

};
/* Inversion pulse END */

/* CPMG - BEGIN */
if(ncyc > 1) {
    initval((ncyc-1),v13);
    loop(v13,v14);

    delay(D_delay);
    dec3unblank();
    dec3prgon(dec3pat,pwd,90.);
    dec3on();
    delay(tauCPMG-2.*D_delay);
    dec3off();
    dec3prgoff();
    dec3blank();
    delay(D_delay-WFG_START_DELAY);

    decshaped_pulse(shp_ca,pwc_ca,one,0.,0.);

    delay(D_delay-WFG_STOP_DELAY);
    dec3unblank();
    dec3prgon(dec3pat,pwd,90.);
    dec3on();
    delay(tauCPMG-2.*D_delay);
    dec3off();
    dec3prgoff();
    dec3blank();
    delay(D_delay);

    endloop(v14);
};

if(ncyc > 0) {

    delay(D_delay);
    dec3unblank();
    dec3prgon(dec3pat,pwd,90.);
    dec3on();
    delay(tauCPMG-2.*D_delay);
    dec3off();
    dec3prgoff();
    dec3blank();
    delay(D_delay-WFG_START_DELAY);

    decshaped_pulse(shp_ca,pwc_ca,one,0.,0.);

    xmtroff();
    obspwrf(tpwrs1_ffst);

```

```

txphase(zero);
xmtron();

delay(D_delay_f-WFG_STOP_DELAY);
dec3unblank();
dec3prgon(dec3pat,pwd,90.);
dec3on();
delay(tauCPMG - (2/PI)*pwc_cp - 2.0e-6-POWER_DELAY -2*D_delay_f );
dec3off();
dec3prgoff();
dec3blank();
delay(D_delay_f);

xmtroff();
};
if(ncyc<0){
txphase(zero);
xmtron();
delay(D_delay);
dec3unblank();
dec3prgon(dec3pat,pwd,90.);
dec3on();
delay(time_T2/2.-pwc_cp*2./PI-2*D_delay);
dec3off();
dec3prgoff();
dec3blank();
delay(D_delay);

xmtroff();
};

decpower(dpwr_cp);
obspwrf(4095.0);
decrpulse(pwc_cp,zero,2.0e-6,0.0);

decpower(dhpwr);

obspower(tpwrs1-3);
txphase(zero);
xmtron();
delay(time_equil/2.);
xmtroff();
txphase(one);
xmtron();
delay(time_equil/2.);
xmtroff();
obspower(tpwr);
txphase(one);

decphase(t1);

/* purge deuterium before starting the lock
(for probes where we do not align 2H magnetization before spin lock) */
delay(2.0e-6);
rgradient('z',gzlv10);
delay(gt0);
rgradient('z',0.0);
delay(200.0e-6);

/* Carbon excitation pulse */
if(opt_water[A]=='Y'){
decrpulse(pwc,t11,0.,0.);
} else {
decrpulse(pwc,t1,0.,0.);
};
decpower(d_ca);
decphase(zero);

delay(taub - POWER_DELAY-202e-6 -2*GRADIENT_DELAY - gt1 -pwc_ca/2. - WFG2_START_DELAY );
delay(2.0e-6);
rgradient('z',gzlv11);
delay(gt1);

```

```

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

simshaped_pulse("hard",shp_ca,2*pw,pwc_ca,one,zero,0.,0.);

delay(taub -pwc_ca/2. -WFG2_STOP_DELAY
      - 202e-6 -2*GRADIENT_DELAY - gt1 - 2.*pw - 3*POWER_DELAY - pws1
      - 2*POWER_DELAY -pwd1 - 4.0e-6 -POWER_DELAY );
/*      \- from decpower after 2*taul */

delay(2.0e-6);
rgradient('z',gzlv11);
delay(gt1);
rgradient('z',0.0);
delay(200.0e-6);

/* purge the CH2 */
ifzero(v1);
  rgpulse(2.*pw,one,0.,0.);
elsenz(v1);
  delay(2.*pw);
endif(v1);

dec2power(dhpwr2);
decpower(dpwrcodec);

/* Turn on proton spin lock */
obspower(tpwrs1);
rgpulse(pws1,zero,0.,0.);
txphase(t12);
xmtron();

/* turn on carbonyl decoupling */
decprgon(codecseq,1.0/dmf_co,dresco);
decon();

/* turn on deuterium decoupling */
dec3phase(one);
dec3power(dpwr3);
dec3rgpulse(pwd1,one,4.0e-6,0.0);
dec3phase(zero);
dec3unblank();
dec3power(dpwr3_D);
dec3prgon("waltz16",pwd,90.);
dec3on();

delay(taul);
dec2rgpulse(2.*pwn,zero,0.,0.);
delay(taul);

decoff();
decprgoff();

decpower(dhpwr);
decrgpulse(pwc,t8,0.,0.);

/* Turn off deuterium decoupling */
dec3off();
dec3prgoff();
dec3blank();
dec3phase(three);
dec3power(dpwr3);
dec3rgpulse(pwd1,three,4.0e-6,0.0);

xmtoff();

obspower(tpwr);
decpower(d_reb);

delay(taub - 2*POWER_DELAY
      -WFG2_START_DELAY - 202e-6 -2*GRADIENT_DELAY - gt2 -pwc_reb/2. );

```

```

delay(2.0e-6);
rgradient('z',gzlvl2);
delay(gt2);
rgradient('z',0.0);
delay(200.0e-6);

simshaped_pulse("hard",shp_reb,2.*pw,pwc_reb,zero,zero,0.,0.);

delay(taub - pwc_reb/2. - WFG2_STOP_DELAY - 202.e-6 -2*GRADIENT_DELAY - gt2 -2.*POWER_DELAY );
delay(2.0e-6);
rgradient('z',gzlvl2);
delay(gt2);
rgradient('z',0.0);
delay(200.0e-6);

decpower(dpwr); /* Set power for decoupling */
dec2power(dpwr2); /* Set power for decoupling */
lk_sample(); /* Turn on the lock */

/* BEGIN ACQUISITION */

status(D);
setreceiver(t7);
}
hscuba 3 1 14 14 14 2 1 8192 1 64
1 0.03
0
dof2 5 1 16 16 16 2 1 8202 1 64
1 1670.78663245
0
decfrq 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 -3000
0
cr 1 1 10000000000 -10000000000 0 4 1 1 1 64
1 4635.64915195
0
axisf 4 2 4 0 0 4 1 0 1 64
1 "s"
4 "m" "n" "s" "u"
arrayelemts 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 3
0
ampmode 2 2 8 0 0 2 1 0 1 64
1 "dddp"
0
aig 2 2 2 0 0 4 1 1 1 64
1 "ai"
2 "nm" "ai"
acqdim 7 1 10000000000 -10000000000 0 2 1 0 1 64
1 2
0
acqcycles 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 1152
0
acqstatus 7 1 32767 0 0 2 1 0 1 64
2 101 18
0
alfa 6 1 8192 -8192 1e-07 2 1 8194 1 64
1 6.6
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 "ncyc,phase"
0
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,sbl(sbl):3,sbs1(sbl):3,gf1(gf1):3,gfs1(gf1):3,awc1(awc1):3,wtfile1,proc1,fn1:0;2:DI
SPLAY:sp:1,wp:1,vs:0,sc:0,wc:0,hzmm:2,is:2,rfl:1,rfp:1,th:0,ins:3,aig*,dcg*,dmq*;"
0
arraydim 7 1 32768 1 1 2 1 5 1 64
1 1152
0
awc 1 1 1 -1 0.001 3 1 1 0 64
1 0
0
at 1 1 14 14 14 2 1 8203 1 64
1 0.0639936
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 "p"
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
cal_pwc 2 2 8 0 0 2 1 0 1 64
1 "n"
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 0 64
1 8
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 1152
0
codecsq 2 2 8 0 0 2 1 0 1 64
1 "co_dec_dfh"
0
cp 2 2 1 0 0 2 1 0 1 64
1 "y"
2 "y" "n"
console 2 2 8 0 0 2 1 0 1 64
1 "inova"
0
dcapwr 7 1 77 0 1 2 1 0 1 64
1 64
0
d_ca 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 61
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
crl 1 1 1000000000 -1000000000 0 4 1 3 1 64
1 6089.34400836
0
ct 7 1 1000000000 0 1 2 1 6 1 64
1 48
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 2.6
0
dataProcessed 1 1 9.99999984307e+17 -9.99999984307e+17 0 3 1 0 1 64
```



```

1 0
0
d_sel 1 1 9 9 9 2 1 8192 1 64
1 50
0
d_reb 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 45
0
date 2 2 9 0 0 2 1 1 1 64
1 "Aug 22 2008"
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 61 0 0 2 1 0 1 64
1 57
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"
dcx 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 -16
0
dmf2 7 1 100000 1 0 2 1 2 1 64
1 1
0
dh2pwr 7 1 77 0 1 2 1 0 1 64
1 0
0
dg 2 2 1023 0 0 4 1 6 1 64
1 "1:SAMPLE:date,sample,seqfil;1:2D ACQUISITION:sw:1,swl:1,ni:0,phase:0,np:0,ss:0,nt:0,at:3;;2:CHANNEL
1:sfrq:3,tn,tof:1,tpwr:0,t_dip:0,tpwrs1:0,tsatpwr:0,pw:2,pw_dip:2,pwsl:2,alfa:1;3:CHANNEL
3:dfrq2:3,dn2,dof2:1,dhpwr2:0,pwn:1;;3:CHANNEL
4:dfrq3:3,dn3,dof3:1,dpwr3:0,dpwr3_D:0,pwd:2,pwd1:2;4:DELAYS:taub:5,d1:3,d2:6,time_T2;;4:FLAGS:fsat,f1180
,ncyc_dipfinal,ampmode;;4:SPECIAL:gain:0,temp:1,ncyc;"
0
deltaone 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
0
deltaf 1 1 100 0 0 4 1 0 1 64
1 0.00296542986425
0
delta 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 1823.1640095
0
deltafrq 5 1 1000000000 -1000000000 0 2 1 0 1 64
1 -19000
0
dfrq2 1 1 1000000000 0 0 2 1 9 1 64
1 60.6874499
0
dfrq 5 1 1000000000 -1000000000 0 2 1 8 1 64
1 150.5854453
0
dfrq3 1 1 1000000000 0 0 2 1 9 1 64
1 91.9264223
0
dg2 2 2 1023 0 0 4 1 7 1 64
1 "1:CHANNEL 2
PULSE:dfrq:7,dn,dof:1,dhpwr:0,pwc:2,dpwr_cp:0,pwc_cp:2,d_ca:0,pwc_ca:2,phase_ca:1,shp_ca,,d_reb:0,pwc_reb
:1,shp_reb,,dpwr_dip:0;2:CHANNEL 2
DEC:dpwr:0,dseq,dm,dmm,dres,dmf,dpwr_codec,codecseq,dmf_co,dresco;3:GRADIENTS:gt0:5,gzlv10:0,gt1:5,gzlv11:
0,gt2:5,gzlv12:0,gt3:5,gzlv13:0;"
0
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,rpl(ni):1,lp1(ni):1;2:CH

```

```

ART:sc:0,wc:0,hzmm:2,vp:0,axis,pltmod,,th:0,,ho:2,vo:2,,rplot,trace:2;3(ni):2D:sp1:1,wpl:1,sc2:0,wc2:0,rfl: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,tl:3;"
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,z3y: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
disCmd 2 2 8 0 0 4 1 0 1 64
1 ""
0
dhpwr 1 1 9 9 9 2 1 8192 1 64
1 63
0
dhp 1 1 9 9 9 2 1 8192 0 64
1 40
0
dhipwr 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 63
0
dhpwr2 7 1 63 -16 1 2 1 2 1 64
1 61
0
dm 4 2 4 0 0 2 1 0 1 64
1 "nnny"
4 "a" "n" "s" "y"
dlp 7 1 10 10 10 2 1 8194 0 64
1 10
0
dlowpwr 7 1 32767 0 0 2 1 0 1 64
1 46
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 "nnnn"
0
dmf 7 1 11 11 11 2 1 8194 1 64
1 8621
0
dn 2 2 4 0 0 2 1 8 1 64
1 "C13"
0
dmgl 2 2 8 0 0 4 1 0 1 64
1 ""
4 "" "av1" "ph1" "pwr1"
dmf_co 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 25000
0
dmf3 7 1 2000000 1 0 2 1 2 1 64
1 7092
0
dmg 2 2 2 0 0 4 1 3 1 64
1 "ph"
0
dmm2 2 2 8 0 0 2 1 0 1 64
1 "cccc"
0
dmm 4 2 4 0 0 2 1 0 1 64
1 "cccp"
9 "c" "f" "g" "m" "p" "r" "u" "w" "x"
dmm3 4 2 4 0 0 2 1 0 1 64
1 "c"
9 "c" "f" "g" "m" "p" "r" "u" "w" "x"
dod 3 1 14 14 14 2 1 8194 1 64
1 0.00999999977648
0

```

```
dn3 2 2 8 0 0 2 1 8 1 64
1 "H2"
0
dn2 2 2 8 0 0 2 1 8 1 64
1 "N15"
0
dof 5 1 8 8 8 2 1 8202 1 64
1 -7557.70185525
0
gf 1 1 100000 0 0 3 1 1 0 64
1 0.0171710532159
0
dseq3 2 2 8 0 0 2 1 0 1 64
1 ""
0
dpwrf 7 1 4095 0 1 2 1 2 0 64
1 4095
0
dpwr3_D 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 51
0
dpwr 7 1 9 9 9 2 1 8194 1 64
1 44
0
dotflag 2 2 8 0 0 4 1 0 1 64
1 "n"
2 "n" "y"
dof3 5 1 20 20 20 2 1 8202 1 64
1 -308.049220719
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 59
0
dpwr2 7 1 18 18 18 2 1 8194 1 64
1 -16
0
dpwr_sl 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 48
0
dpwr_dip 1 1 9 9 9 2 1 8192 1 64
1 56
0
dpwr_cp 1 1 9 9 9 2 1 8192 1 64
1 61
0
dpwr_reb 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 60
0
dpwrcodec 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 30
0
dres3 7 1 360 1 0 2 1 0 1 64
1 1
0
dres 7 1 360 1 0 2 1 0 1 64
1 90
0
dres2 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 "waltz16"
0
dresco 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 9
0
dseq2 2 2 8 0 0 2 1 0 1 64
1 ""
0
file 2 2 6 0 0 2 1 3 1 64
```

```
1 "exp"
0
fad2 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
explist 2 2 8 0 0 2 1 0 1 64
1 ""
0
exp3D 2 2 8 0 0 2 1 0 1 64
1 "n"
0
flcoef 2 2 8 0 0 3 1 1 1 64
1 ""
0
fl180 2 2 8 0 0 2 1 0 1 64
1 "y"
0
fad1 2 2 8 0 0 2 1 0 1 64
1 "y"
0
fidid 2 2 8 0 0 2 1 0 1 64
1 ""
0
fb 7 1 6 6 6 2 1 8203 0 64
1 5000
0
fn1 7 1 524288 64 -2 3 1 1 1 64
1 128
0
fmlev 4 2 4 0 0 2 1 0 1 64
1 "n"
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
flag3d 2 2 8 0 0 2 1 0 1 64
1 "y"
0
fn 7 1 524288 64 -2 3 1 1 1 64
1 8192
0
fpmult1 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
fpmult 1 1 1000000000 0 0 3 1 0 1 64
1 0.5
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 24
0
gzlv10 1 1 32768 -32768 1 2 1 0 1 64
1 20000
0
gt11 3 1 14 14 14 2 1 8192 1 64
1 0.001
0
gt0 3 1 32768 -32768 -1 2 1 8192 1 64
1 0.0015
```

```

0
gfs 1 1 1000 -1000 0.001 3 1 1 0 64
1 0.003
0
gfl 1 1 100000 0 0 3 1 1 0 64
1 0.0050210384652
0
gfs1 1 1 1000 -1000 0.001 3 1 1 0 64
1 0
0
gt10 3 1 14 14 14 2 1 8192 1 64
1 0.001
0
gt1 3 1 14 14 14 2 1 8192 1 64
1 0.0005
0
gt5 3 1 14 14 14 2 1 8192 1 64
1 0.003
0
gt3 3 1 14 14 14 2 1 8192 1 64
1 0.0015
0
gt2 3 1 14 14 14 2 1 8192 1 64
1 0.00016
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 0.001
0
gt6 3 1 14 14 14 2 1 8192 1 64
1 0.001
0
gzlv16 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 26450
0
gzlv12 1 1 32768 -32768 1 2 1 0 1 64
1 12000
0
gzlv110 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 12400
0
gzlv11 1 1 32768 -32768 1 2 1 0 1 64
1 3000
0
gzlv111 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 10200
0
gzlv14 1 1 32768 -32768 1 2 1 0 1 64
1 12000
0
gzlv13 1 1 32768 -32768 1 2 1 0 1 64
1 15000
0
gzlv15 1 1 32768 -32768 1 2 1 0 1 64
1 24000
0
homo2 4 2 4 0 0 2 1 0 1 64
1 "n"
2 "n" "y"
ho 1 1 500 -500 0 4 1 1 1 64
1 -132.5
0
gzlv17 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 12000
0
homo 2 2 8 0 0 2 1 0 1 64
1 "n"
2 "n" "y"
hs 4 2 4 0 0 2 1 0 1 64
1 "nnyn"
2 "n" "y"

```

```
homo3 4 2 4 0 0 2 1 0 1 64
1 "n"
2 "n" "y"
satflg 2 2 8 0 0 2 1 0 1 64
1 "y"
0
priority 7 1 32768 0 1 2 1 0 1 64
1 5
0
mcyc 7 1 32767 0 0 2 1 0 1 64
1 1
0
llfrq 1 1 1000000000 -1000000000 0 4 1 0 0 64
1 0
0
io 1 1 500 -500 0.1 4 1 1 1 64
1 10
0
ins2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 100
0
il 2 2 1 0 0 2 1 0 1 64
1 "n"
2 "y" "n"
hzmm 1 1 1000000000 -1000000000 0 4 1 11 1 64
1 19.9922335984
0
hst 3 1 0.02 0 2.5e-08 2 1 2 1 64
1 0.01
0
ins 3 1 8190 0 1e-07 4 1 3 1 64
1 100
0
in 4 2 1 0 0 2 1 0 1 64
1 "n"
3 "n" "w" "y"
intmod 2 2 8 0 0 4 1 0 1 64
1 "off"
3 "off" "partial" "full"
insref 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 0 64
1 1
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
lbl 1 1 100000 -100000 0 3 1 1 1 64
1 10
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
is 1 1 1000000000 1e-06 0 4 1 3 1 64
1 4000
0
jnh 1 1 10000 80 0 2 1 1024 1 64
1 106
0
jxh2 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 94
0
lb 1 1 100000 -100000 0 3 1 1 0 64
1 30
0
lifr 1 1 1000000000 -1000000000 0 4 1 0 1 64
7 4184.7535823 3445.32962737 3445.32962737 2811.537666 2811.537666 2072.11371107 0
0
lcpeak_ 7 1 32767 0 0 2 1 0 1 64
```

```

1 0
0
liamp 1 1 1000000000 0 0 4 1 0 0 64
4 0 0 0 0.577882409096
0
llamp 1 1 1000000000 0 0 4 1 0 0 64
1 0
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 35
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 91.9267
0
lockpower_ 1 1 68 0 1 2 1 16 1 64
1 37
0
lockphase_ 1 1 360 0 1 2 1 16 1 64
1 257
0
lp 1 1 3600 -3600 0.1 4 1 3 1 64
1 0
0
lsfrq1 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
lsfrq 1 1 9.99999984307e+17 -9.99999984307e+17 0 3 1 0 0 64
1 0
0
macro 2 2 6 0 0 4 1 3 1 64
1 ""
0
lvl 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 0.0059670781738
0
math 2 2 1 0 0 3 1 3 1 64
1 "f"
3 "d" "f" "i"
opt_water 2 2 8 0 0 2 1 0 1 64
1 "n"
0
ncyc_time 3 1 14 14 14 2 1 8192 1 64
1 0.005
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
method 2 2 6 0 0 2 1 3 1 64
1 "/vnmr/shimmethods/zl22"
0
mixshift 3 1 14 14 14 2 1 8192 1 64
1 0

```

```
0
n3 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
n2 2 2 6 0 0 4 1 3 1 64
1 ""
0
ncyc_dipfinal 7 1 32767 0 0 2 1 0 1 64
1 2
0
ncyc 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
18 0 -1 13 1 12 2 11 3 10 4 9 5 8 6 7 2 10 6
0
nt 7 1 1000000000 1 1 2 1 2 1 64
1 48
0
notebook 2 2 8 0 0 2 1 0 1 64
1 ""
0
ni 7 1 32767 0 0 2 1 0 1 64
1 32
0
np 7 1 524288 32 2 2 1 11 1 64
1 1152
0
offset_H 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
0
phase 7 1 4 0 1 2 1 0 1 64
2 1 2
0
page 2 2 8 0 0 2 1 0 1 64
1 ""
0
oslsfrq 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 1 0 64
1 0
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
1 165
0
osfilt 2 2 8 0 0 2 1 0 1 64
1 ""
5 "a" "A" "b" "B" ""
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 22
0
pad 3 1 14 14 14 2 1 8194 1 64
1 0
0
parstyle_ 2 2 8 0 0 4 1 0 1 64
1 "ppa"
0
paramChanged 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
0
parversion 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 4 1 64
1 5.1
0
phfid1 1 1 3600 -3600 0.1 3 1 0 0 64
1 0
0
phase_reb 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
0
```



```
phase_cpmg 1 1 360 -360 0.5 2 1 0 1 64
1 358
0
phase_ca 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
0
phfid 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
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"
presat 3 1 14 14 14 2 1 8192 1 64
1 1.5
0
preacq 6 1 13 13 13 2 1 8192 0 64
1 0
0
pwx1 6 1 13 13 13 2 1 8192 1 64
1 36
0
pwc_cp 6 1 13 13 13 2 1 8192 1 64
1 16.5
0
pslabel 2 2 8 0 0 2 1 11 1 64
1 "CaHD_cpmg_GLY_dfh_600_v1"
0
procdim 7 1 1000000000 -1000000000 0 3 1 0 1 64
1 1
0
proc 2 2 10 0 0 3 1 1 1 64
1 "ft"
0
probe_ 2 2 8 0 0 2 1 8 1 64
1 ""
0
procl 2 2 10 0 0 3 2 1 1 64
1 "ft"
0
processid 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
0
pw_dip 6 1 13 13 13 2 1 8192 1 64
1 29.9
0
pw 6 1 13 13 13 2 1 8194 1 64
1 7.2625
0
purge_flg 2 2 8 0 0 2 1 0 1 64
1 "y"
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 13.6
0
pwc_ca 6 1 13 13 13 2 1 8192 1 64
1 454
0
pwd1 6 1 13 13 13 2 1 8192 1 64
1 146.3
0
pwc180 6 1 13 13 13 2 1 8192 1 64
1 254
0
pwc_sel 6 1 13 13 13 2 1 8192 1 64
```

```
1 1776
0
pwc_reb 6 1 13 13 13 2 1 8192 1 64
1 2754
0
pwca 6 1 13 13 13 2 1 8192 1 64
1 50
0
pwcod 6 1 13 13 13 2 1 8192 1 64
1 234
0
pwco_sh 2 2 8 0 0 2 1 0 1 64
1 "herm180_17p6_750"
0
pwd 6 1 13 13 13 2 1 8192 1 64
1 335
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 48.25
0
pwh_sl 6 1 13 13 13 2 1 8192 1 64
1 19.3
0
pwn 6 1 13 13 13 2 1 8192 1 64
1 42.5
0
pws1 6 1 13 13 13 2 1 8192 1 64
1 18.825
0
pwreb_cp 6 1 13 13 13 2 1 8192 1 64
1 354
0
reffrq1 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 125.5435963
0
r4 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 0.0182848
0
r1 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 0.2
0
pwx2 6 1 13 13 13 2 1 8192 1 64
1 0
0
pwx1x 6 1 13 13 13 2 1 8192 1 64
1 1004
0
pxcodec 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 17.675
0
r7 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 0
0
r6 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
ref 5 1 1000000000 -1000000000 0 3 1 0 1 64
1 0
0
rec_phase 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
```

```

0
reffrq 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 598.843071801
0
rfp 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 2858.8768248
0
refsource1 2 2 8 0 0 4 1 0 1 64
1 "sfrq"
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 0
0
rfl 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 4514.62829729
0
rfband 4 2 4 0 0 2 1 0 1 64
1 "cccc"
3 "c" "h" "l"
rfl1 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 1500.03750094
0
rp 1 1 3600 -3600 0.1 4 1 3 1 64
1 145.705882353
0
rof1 6 1 13 13 13 2 1 8194 1 64
1 0
0
rfp1 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 7281.5285854
0
rof2 6 1 13 13 13 2 1 8194 1 64
1 2
0
sample 2 2 8 0 0 2 1 0 1 64
1 "t4199a"
0
rpl 1 1 3600 -3600 0.1 4 1 3 1 64
1 0
0
samplename 2 2 8 0 0 2 1 0 1 64
1 ""
0
tnsat 4 2 4 0 0 2 1 0 1 64
1 "y"
0
ss 7 1 32767 -32768 0 2 1 0 1 64
1 64
0
sf 1 1 8190 0 1e-07 4 1 3 1 64
1 0
0
sbs 1 1 1000 -1000 0.001 3 1 1 1 64
1 -0.0849999999999
0
sb 1 1 1000 -1000 0.001 3 1 0 1 64
1 -0.0849999999999
0
satpwr 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 12
0
satfrq 5 1 1000000000 -1000000000 0 2 1 0 1 64
1 -9970
0
saveglobal_ 2 2 8 0 0 3 1 0 1 64
15 "probe"
"lcpeak"
"loc"
"lockpower"
"lockgain"

```

```
"lockphase"
"lockfreq"
"z0"
"lko"
"vloc"
"vrack"
"vzone"
"vproto"
"pkpick"
"parstyle"
0
sbl 1 1 1000 -1000 0.001 3 1 1 1 64
1 -0.08499999999999999
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
sbs1 1 1 1000 -1000 0.001 3 1 1 1 64
1 -0.08499999999999999
0
sc2 1 1 3 3 3 4 1 8195 1 64
1 0
0
sel_car 2 2 8 0 0 2 1 0 1 64
1 "y"
0
seqfil 2 2 8 0 0 2 1 11 1 64
1 "CaHD_cpmg_GLY_dfh_600_v1"
0
shp_reb 2 2 8 0 0 2 1 0 1 64
1 "reb_on_gly"
0
sh_reb 2 2 8 0 0 2 1 0 1 64
1 "reb_on_ca"
0
sfrq 1 1 1000000000 0 0 2 1 11 1 64
1 598.8459165
0
sfl 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 "reb_on_ca"
0
shims 2 2 8 0 0 2 1 0 1 64
1 ""
0
shape 2 2 8 0 0 2 1 0 1 64
1 "herm180_trc"
0
shp_ca 2 2 8 0 0 2 1 0 1 64
1 "CA_burp_dfh"
0
solvent 2 2 6 0 0 2 1 11 1 64
1 "d2o"
0
shp_x 2 2 8 0 0 2 1 0 1 64
1 "reb_on_dfh"
0
shp_sel 2 2 8 0 0 2 1 0 1 64
1 "reb_33pt4"
0
sn 1 1 1e+18 -1e+18 0 3 1 1 1 64
1 0
0
spl 1 1 1000000000 -1000000000 0 4 1 3 1 64
1 5781.49108446
0
sp 1 1 1000000000 -1000000000 0 4 1 3 1 64
1 137.396592318
```

```
0
spin 1 1 32000000 0 0.1 2 1 0 0 64
1 0
0
time_T2 3 1 14 14 14 2 1 8192 1 64
1 0.014
0
t_dip 1 1 17 17 17 2 1 8192 1 64
1 50
0
ssorder 7 1 20 1 1 3 1 0 0 64
1 7
0
sslsfrq 1 1 9.99999984307e+17 -9.99999984307e+17 0 3 1 0 0 64
1 0
0
ssfilter 1 1 50000 10 0.1 3 1 0 0 64
1 10
0
ssntaps 7 1 2500 0 1 3 1 0 1 64
1 121
0
sw 1 1 5 5 5 2 1 8203 1 64
1 9000.90009001
0
sspul 2 2 8 0 0 2 1 0 1 64
1 "n"
0
swl 1 1 5000000 1 -2.5e-08 2 1 0 1 64
1 1253.99711581
0
taum 3 1 14 14 14 2 1 8192 1 64
1 0.0007838
0
taub 3 1 14 14 14 2 1 8192 1 64
1 0.0017543875
0
taua 3 1 14 14 14 2 1 8192 1 64
1 0.0016
0
th 1 1 1000000000 0 0 4 1 1 1 64
1 2
0
temp 1 1 200 -150 0.1 2 1 8 1 64
1 25
0
th2d 1 1 1 1e-18 0 4 1 17 1 64
1 0.8
0
time_submitted 2 2 8 0 0 2 1 0 1 64
1 "20080822T005655"
0
time_plotted 2 2 8 0 0 3 1 0 1 64
1 ""
0
time_equil 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0.003
0
time_complete 2 2 8 0 0 2 1 0 1 64
1 "20080823T193601"
0
time_run 2 2 8 0 0 2 1 0 1 64
1 "20080822T013748"
0
time_processed 2 2 8 0 0 3 1 0 1 64
1 "20080822T113819"
0
time_saved 2 2 8 0 0 2 1 0 1 64
1 ""
0
tlt 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 -0.0118805473903
0
```

```
time_svfddate 2 2 8 0 0 2 1 0 1 64
1 "20080822T005655"
0
time_submitted_local 2 2 8 0 0 2 1 0 1 64
1 "20080822T005655X12AMFriAug"
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
y3 7 1 19 19 19 2 1 8192 1 64
1 3857
0
wfl 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0.0510367999999
0
vproto_ 2 2 8 0 0 2 1 0 1 64
1 ""
0
tsatpwr 1 1 17 17 17 2 1 8192 1 64
1 -16
0
tpwrml 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 47
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 -1555.25
0
tpwrf 7 1 4095 0 1 2 1 2 0 64
1 4095
0
trace 2 2 2 0 0 4 1 3 1 64
1 "f2"
2 "f1" "f2"
tpwrs1 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 55
0
trim 3 1 14 14 14 2 1 8192 1 64
1 0.0005
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 590153.048397
0
username 2 2 8 0 0 2 1 0 1 64
1 "guest"
0
vloc_ 2 2 8 0 0 2 1 8 1 64
1 "C7"
0
vpf 1 1 500 -500 0 4 1 0 1 64
1 16.1448614824
0
vp 7 1 500 -500 0.1 4 1 3 1 64
1 43.8855400571
0
vpfi 1 1 500 -500 0 4 1 0 1 64
1 0
0
wbs 2 2 6 0 0 3 1 3 1 64
1 ""
0
vsproj 1 1 1000000000 1e-06 0 4 1 3 1 64
1 23656.8943479
0
vs 1 1 1000000000 1e-06 0 4 1 3 1 64
```

```
1 260598.428735
0
vrack_ 7 1 5 1 0 2 1 0 1 64
1 1
0
vs2d 1 1 1000000000 1e-06 0 4 1 3 1 64
1 22686.7490491
0
vtwait 3 1 14 14 14 2 1 8194 1 64
1 180
0
vtc 1 1 255 0 1 2 1 2 1 64
1 0
0
vzone_ 7 1 15 1 0 2 1 0 1 64
1 1
0
werr 2 2 6 0 0 3 1 3 1 64
1 ""
0
wc2 1 1 4 4 4 4 1 8195 1 64
1 130
0
wc 1 1 2 2 2 4 1 8203 1 64
1 225
0
wdone 2 2 8 0 0 3 1 0 1 64
1 "acqdone"
0
wf 1 1 8190 0 1e-07 4 1 3 1 64
1 0.0638825
0
wexp 2 2 6 0 0 3 1 3 1 64
1 "kk_relax"
0
x2y2 7 1 19 19 19 2 1 8192 1 64
1 -3268
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"
wp 1 1 5000000 0 0 4 1 11 1 64
1 4498.25255963
0
wnt 2 2 6 0 0 3 1 3 1 64
1 ""
0
wpl 1 1 100000 0 0 4 1 3 1 64
1 1253.99711581
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
x1 7 1 19 19 19 2 1 8192 1 64
1 -1206
0
xy 7 1 19 19 19 2 1 8192 1 64
1 2155
0
x4 7 1 19 19 19 2 1 8192 1 64
1 0
0
x3 7 1 19 19 19 2 1 8192 1 64
1 5285
0
xdiag 1 1 1e+18 0 0 4 1 17 1 64
1 0
0
xz2 7 1 19 19 19 2 1 8192 1 64
1 1657
```

```
0
xz 7 1 19 19 19 2 1 8192 1 64
1 -1524
0
y1 7 1 19 19 19 2 1 8192 1 64
1 1477
0
z3x 7 1 19 19 19 2 1 8192 1 64
1 4903
0
z2 7 1 19 19 19 2 1 8192 1 64
1 -4355
0
z0_ 1 1 19 19 19 2 1 8208 1 64
1 -12159
0
yz 7 1 19 19 19 2 1 8192 1 64
1 -3267
0
y4 7 1 19 19 19 2 1 8192 1 64
1 0
0
yz2 7 1 19 19 19 2 1 8192 1 64
1 10906
0
z1c 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 13474
0
z2xy 7 1 19 19 19 2 1 8192 1 64
1 -4474
0
z2x2y2 7 1 19 19 19 2 1 8192 1 64
1 -8497
0
z2c 7 1 19 19 19 2 1 8192 1 64
1 0
0
z2x3 7 1 19 19 19 2 1 8192 1 64
1 4562
0
z3 7 1 19 19 19 2 1 8192 1 64
1 229
0
z2y3 7 1 19 19 19 2 1 8192 1 64
1 1518
0
z3c 7 1 19 19 19 2 1 8192 1 64
1 0
0
z5 7 1 19 19 19 2 1 8192 1 64
1 8877
0
z4x 7 1 19 19 19 2 1 8192 1 64
1 1243
0
z3y 7 1 19 19 19 2 1 8192 1 64
1 -8662
0
z3x3 7 1 19 19 19 2 1 8192 1 64
1 -440
0
z3x2y2 7 1 19 19 19 2 1 8192 1 64
1 -1232
0
z3xy 7 1 19 19 19 2 1 8192 1 64
1 -2734
0
z4 7 1 19 19 19 2 1 8192 1 64
1 2773
0
```


z3y3 7 1 19 19 19 2 1 8192 1 64
1 -2324
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 1609
0
z4x2y2 7 1 19 19 19 2 1 8192 1 64
1 -2702
0
z4y 7 1 19 19 19 2 1 8192 1 64
1 42
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 5691
0
z5x 7 1 19 19 19 2 1 8192 1 64
1 -2185
0
z6 7 1 19 19 19 2 1 8192 1 64
1 -15605
0
zx2y2 7 1 19 19 19 2 1 8192 1 64
1 162
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 12677
0
zx3 7 1 19 19 19 2 1 8192 1 64
1 571
0
zy3 7 1 19 19 19 2 1 8192 1 64
1 2167
0

/* CaHD_cpmg_GLY_dfh_600_v2.c

This pulse sequence will allow t2 to perform the following experiment:

2D C13,1H correlation map to observe exchange with variable CPMG spacing
exchange is quantified in the Ca positions of GLY where labeled with
50%D, i.e., we quantify the dispersion at the CHD position, while suppressing
CH2.

Uses two channels:

1) 1H - 4.73 ppm
2) 13C - 43.9 ppm (so we can suppress the Cb from other residues).
3) 15C - 119 ppm

Set dm = 'nnny', dmm = 'cccp' [13C decoupling during acquisition].
Set dm2 = 'nnnn', dmm2 = 'cccp'.

Must set phase = 1,2 for States-TPPI acquisition in t1 [13C].

in this sequence the deuterium decoupling is performed as a series of
pi pulses (not covering the carbon pulse).

Proton Pulses:

Sit on the HDO signal at 4.774ppm

pw @ tpwr : Hard pulse - max power
pws1 @ tpws1 : SpinLock power during carbon CPMG.;

Carbon Pulses:

Sit at 43.9 ppm with the carrier.

pwc @ dhpwr : high power 13C 90 pulse at dhpwr
pwc_cp @ dpwr_cp : pulse width of the 90s immediately flanking the CPMG period.
pwc_ca @ d_ca : Selective (Ca && !CO) pulses. Phase can be adjusted with phase_ca.
Use the RF_CO_Ca_burp_600_v3 program
pwc_reb @ d_reb : A selective Re-burp pulse (Ca(gly) && !Cb(!gly))
shape is shp_reb. Maximum length is 2.750 ms.
1./dmf @ dpwr : Decoupling during Acquisition
1./dmf_co @ dpwr_codec : Decoupling during indirect acquisition
Pattern 'codecsq' should be a low power adiabatic decoupling,
e.g. a WURST-2 sequence.
ncyc can be either even or odd :)

Deuterium Pulses:

Sit in the middle of the Glycine region (4.0)ppm

pwd: Low power decoupling - around 350us
pwd1: High power deuterium pulses.

Delays

taua: set to slightly less than 1/4J
taub: set to exactly 1/4J

Written D. F. Hansen on August 12 2008.

Modified on Aug 15 2008 by DF Hansen,
Only decouple 2H between the carbon pulses

Modified on Aug 16th 2008 by DF Hansen,
Select a decoupling pattern for 2H that is optimum for the tauCPMG
delay.
One must have 'CW.DEC', 'Composite.DEC', 'WALTZ-1.DEC', and 'WALTZ-4.DEC'

Modified on Aug 21 2008 by DF Hansen,
changed phase cycle (t10).

Modified on August 29 2008 by DF Hansen
Replace the HetCP transfer from H->C with a double refocus INEPT
Changed phase cycle.

*/

```

#include <standard.h>

static int  phil[2] = {1,3},
            phi2[4] = {1,1,3,3},
            phi3[8] = {1,1,1,1,3,3,3,3},
            phi4[4] = {0,0,0,0},
            phi6[16] = {0,0,0,0,0,0,0,0,2,2,2,2,2,2,2,2}, /* 180x in middle of CPMG */
            phi8[1] = {0},
            phi10[8] = {0,0,0,0,2,2,2,2},
            phi11[2] = {1,1},
            phi12[16] = {1,1,1,1,1,1,1,1,3,3,3,3,3,3,3,3},
            rec[8] = {0,2,2,0,0,2,2,0};

static double d2_init=0.0;

pulsesequance() {
/* DECLARE VARIABLES */

char      fsat[MAXSTR],
          fscuba[MAXSTR],
          fl180[MAXSTR], /* Flag to start t1 @ halfdwell */
          shp_ca[MAXSTR], /* CPMG pulse */
          shp_reb[MAXSTR],
          codecseq[MAXSTR],
          opt_water[MAXSTR],
          dec3pat[MAXSTR];

int       phase,
          t1_counter, /* used for states tppi in t1 */
          ncyc_dipfinal,
          rec_phase;

double    tau1, /* t1 delay */
          taua, /* set to approx. 1/4JCH */
          taub, /* set to exactly 1/4JCH */
          pwc, /* 90 c pulse at dhpwr */
          tsatpwr, /* low level 1H trans.power for presat */
          dhpwr, /* power level for high power 13C pulses on dec1 */
          sw1, /* sweep width in f1 */

          dpwr_cp, /* power level for 13C CPMG */
          pwc_cp, /* 13C pw for CPMG */

          ncyc, /* number of CPMG cycles */
          ncycmax,
          time_T2, /* total time for CPMG trains */
          tauCPMG,

          dhpwr2,
          pwn,

          p10,p11,p12,p13,p14,p15,p16,p17,p18,
          pw_dip,
          p_d,

          dpwr_dip,
          t_dip,

          /* Deuterium Decoupling during CPMG train */
          dpwr3_D, /* power level for deuterium decoupling */
          dpwr3_f, /* Fine power adjustment of the deuterium decoupling */
          pwd, /* pw90 D for decoupling */
          pwd1, /* Hi power D 90 */

          /* 180 pulse in the CPMG */
          pwc_ca,
          d_ca,
          phase_ca,

          /* Re-burp on Glycine */
          pwc_reb,
          d_reb,

```

```

/* Carbonyl decoupling during indirect acquisition */
dmf_co,
dresco,
dpwrcodec,

/* Decoupling on protons during CPMG */
pws1,
pws1_f,
pws1_ffst,
tpwrs1,
tpwrs1_ffst=0.,
tpwrs1_f=0.,
numpulse, numpulsefst,

numD,D_delay,numD_f,D_delay_f,

time_equil,

gt0,
gt1,
gt2,
gt3,
gt4,gt5,gt6,gt7,

gzlv10,
gzlv11,
gzlv12,
gzlv13,
gzlv14,gzlv15,gzlv16,gzlv17,
gzlv110;

/* LOAD VARIABLES */
getstr("opt_water",opt_water);
getstr("fsat",fsat);
getstr("f1180",f1180);
getstr("fscuba",fscuba);

getstr("shp_ca",shp_ca);

getstr("codecseq",codecseq);
getstr("shp_reb",shp_reb);

taua = getval("taua");
taub = getval("taub");
pwc = getval("pwc");
tpwr = getval("tpwr");
tsatpwr = getval("tsatpwr");

dhpwr = getval("dhpwr");
dpwr = getval("dpwr");

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

dpwr_cp = getval("dpwr_cp");
pwc_cp = getval("pwc_cp");
ncyc = getval("ncyc");
time_T2 = getval("time_T2");

pwc_reb = getval("pwc_reb");
d_reb = getval("d_reb");

dhpwr2 = getval("dhpwr2");
pwn = getval("pwn");

ncyc_dipfinal = getval("ncyc_dipfinal");
dpwr_dip = getval("dpwr_dip");
t_dip = getval("t_dip");
pw_dip = getval("pw_dip");
rec_phase= (int)(getval("rec_phase")+0.5);

dpwr3_D = getval("dpwr3_D");

```

```

dpwr3_f = 0.;
pwd = getval("pwd");
pwd1 = getval("pwd1");

pwc_ca = getval("pwc_ca");
d_ca = getval("d_ca");
phase_ca = getval("phase_ca");

dmf_co = getval("dmf_co");
dresco = getval("dresco");
dpwrcodec = getval("dpwrcodec");

/* SpinLock decoupling during the CPMG train */
pws1 = getval("pws1");
tpws1 = getval("tpws1");

/* Equilibrium time before and after CPMG */
time_equil=getval("time_equil");

p_d = (50.0/90.0)*pw_dip;

p10 = 4.9*p_d;
p11 = 7.9*p_d;
p12 = 5.0*p_d;
p13 = 5.5*p_d;
p14 = 0.6*p_d;
p15 = 4.6*p_d;
p16 = 7.2*p_d;
p17 = 4.9*p_d;
p18 = 7.4*p_d;

gt0 = getval("gt0");
gt1 = getval("gt1");
gt2 = getval("gt2");
gt3 = getval("gt3");
gt4 = getval("gt4");
gt5 = getval("gt5");
gt6 = getval("gt6");
gt7 = getval("gt7");

gzlv10 = getval("gzlv10");
gzlv11 = getval("gzlv11");
gzlv12 = getval("gzlv12");
gzlv13 = getval("gzlv13");
gzlv14 = getval("gzlv14");
gzlv15 = getval("gzlv15");
gzlv16 = getval("gzlv16");
gzlv17 = getval("gzlv17");
gzlv110= getval("gzlv110");

/* LOAD PHASE TABLE */

settable(t1,2,phi1);
settable(t2,4,phi2);
settable(t3,8,phi3);
settable(t4,4,phi4);
settable(t6,16,phi6);
settable(t7,8,rec);
settable(t8,1,phi8);
settable(t10,8,phi10);

settable(t11,2,phi11);
settable(t12,16,phi12);

/* CHECK VALIDITY OF PARAMETER RANGES */
if ( sfrq > 750. ){
    printf(" You should change the probe. Don't use this sequence at 800MHz\n");
    abort(1);
};

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

```

```

};
if((dm2[A] == 'y' || dm2[B] == 'y' || dm2[C] == 'y' || dm2[D] == 'y')) {
    printf("incorrect dec2 decoupler flags! ");
    abort(1);
};
if( tsatpwr > 6 ) {
    printf("TSATPWR too large !!! ");
    abort(1);
};
if( dpwr > 48 ) {
    printf("don't fry the probe, DPWR too large! ");
    abort(1);
};
if(dpwr_cp > 61) {
    printf("don't fry the probe, dpwr_cp too large: < 61! ");
    abort(1);
};
if( dpwr2 > -16 ) {
    printf("don't fry the probe, DPWR2 too large! ");
    abort(1);
};
if( pw > 20.0e-6 ) {
    printf("dont fry the probe, pw too high ! ");
    abort(1);
};
if(ncyc > 40) {
    printf("ncyc_cp is too large; must be less than 41\n");
    abort(1);
};
if(time_T2 > 0.040) {
    printf("time_T2 is too large; must be less than 40 ms\n");
    abort(1);
};

ncycmax = time_T2/1e-3;
if ( ncyc > ncycmax ) {
    printf(" Maximum of ncyc is exceeded \n");
    printf(" ncyc < time_T2*1000 = %.0f \n",ncycmax);
    abort(1);
};
if(ncyc > 0) {
    tauCPMG = time_T2/(4.0*ncyc) - pwc_ca/2.;
    if(ix==1) {
        printf("nuCPMG for current experiment is (Hz): %5.3f\n",1/(4.0*(tauCPMG+pwc_ca/2.)));
    };
} else {
    tauCPMG = time_T2/(4.0) - pwc_ca/2.;
    if(ix==1) {
        printf("nuCPMG for current experiment is (Hz): not applicable\n");
    };
};
if(tauCPMG - (2.0/PI)*pwc_cp - WFG_START_DELAY < 5e-6) {
    printf("tauCPMG is too small; decrease ncyc_cp\n");
    abort(1);
};
if(tpwrs1 > 57) {
    printf("tpwrs1 < 58\n");
    abort(1);
};
if(dpwr_dip > 56) {
    printf("dpwr_dip < 57\n");
    abort(1);
};
if(t_dip > 55) {
    printf("t_dip is too high; < 56\n");
    abort(1);
};
if(pwc_ca > 200e-6 && d_ca > 55 && shp_ca[A]=='h'){
    printf(" Too much power for CPMG-symetric inversion pulse: (pwc_ca,d_ca)\n");
    abort(1);
};
if(d_reb > 55 ){
    printf(" d_reb is too large; d_reb < 55dB \n");

```

```

    abort(1);
};
if ( pwc_reb > 2.755e-3 ){
    printf(" pwc_reb is too long; pwc_reb<2.75ms\n");
    abort(1);
};
if(pwc_ca > 2e-3 ) {
    printf(" pwc_ca is too long! \n");
    abort(1);
};
if( d_ca > 61 ){
    printf(" d_ca too high! \n");
    abort(1);
};
if(dpwr3_D > 51) {
    printf("Deuterium decoupling power is too high; <= 50\n");
    abort(1);
}
if(dpwr3 > 59) {
    printf("Deuterium pulse power is too high; <= 59\n");
    abort(1);
}
if(pwd>500e-6){
    printf(" Please calibrate the deuterium decoupling to pwd slightly less than 500us\n");
    abort(1);
};
if(gzlvl10>400){
    printf("gzlvl10 too large!\n");
    abort(1);
};
/* Calculate the CW proton decoupling (during CPMG) */
numpulsefst=floor((tauCPMG - (2/PI)*pwc_cp - 2.0e-6 - POWER_DELAY)/(2.0*pwsl));
numpulse=floor((tauCPMG+pwc_ca/2.)/(2.0*pwsl));

/* Calculate the corresponding 90 pulse widths */
pws1_f_fst=(tauCPMG - (2/PI)*pwc_cp - 2.0e-6 - POWER_DELAY)/(2.0*numpulsefst);
pws1_f=(tauCPMG+pwc_ca/2.)/(2.0*numpulse);

/* Calculate the corresponding powers */
tpwrs1_f_fst=4095.0*pws1/pws1_f_fst;
tpwrs1_f=4095.0*pws1/pws1_f;

if(ix == 1){
    printf("numpulsefst %5.0f, pws1_f_fst %4.2fus, tpwrs1_f_fst
%8.2f\n",numpulsefst,pws1_f_fst*1e6,tpwrs1_f_fst);
    printf("numpulses %5.0f, pws1_f %4.2fus, tpwrs1_f
%8.2f\n",numpulse,pws1_f*1e6,tpwrs1_f);
};

/* Calculate the CW Deuterium decoupling during CPMG */
/* see how many pi pulses we can fit into tauCPMG */
numD =floor(tauCPMG/(2.*pwd));
numD_f=floor( (tauCPMG-2.*pwc_cp/PI-2.e-6-POWER_DELAY)/(2*pwd));

D_delay =(tauCPMG-2.*numD*pwd)/2.;
D_delay_f=(tauCPMG-2.*pwc_cp/PI-2.e-6-POWER_DELAY - 2.*numD_f*pwd )/2.;

if(ncyc<0){
    numD=floor((time_T2/2.-2.*pwc_cp/PI)/(2.*pwd));
    D_delay=(time_T2/2.-2.*pwc_cp/PI-2.*numD*pwd)/2.;
};

/* Now select the best decoupling pattern we can fit in */
if(numD<2){
    strcpy(dec3pat,"CW");
};
if ( numD>1 ){ /* 90x-180y-90x */
    strcpy(dec3pat,"Composite");
};
if ( numD>2 ){ /* 90x-180-x 270x */
    strcpy(dec3pat,"WALTZ-1");
};
if ( numD>12){

```

```

    strcpy(dec3pat, "WALTZ-4");
};

/* Phase incrementation for hypercomplex 2D data */
if(phase == 2) {
    tsadd(t1,1,4);
    tsadd(t11,1,4);
};
/* Set up f1180 taul = t1 */
taul = d2;
if(f1180[A] == 'y') {
    taul += ( 1.0 / (2.0*sw1)) - 2.0*pwn - 2.0e-6;
    if(taul < 0.4e-6) {
        taul = 0.4e-6;
    };
} else {
    if(taul>2*pwn){
        taul=taul-2*pwn;
    }
};
taul = taul/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 );

/* TPPI moves artifacts to the edge of the spectrum */
if(t1_counter % 2) {
    tsadd(t8,2,4);
    tsadd(t7,2,4);
};

/* BEGIN ACTUAL PULSE SEQUENCE */
status(A);

/* if ncyc == 0 apply 1H saturation at tpwrs1, tpwrs1_f for time_T2 */

obspower(tpwrs1);
rgpulse(pwsl,one,0.,0.);
txphase(zero);
obspwrf(tpwrs1_f);

obsunblank();
xmtron();
if(ncyc==0) {
    delay(time_T2);
};
if( (ni-1)/sw1-d2>0.){
    delay((ni-1)/sw1-d2);
};

xmtroff();
obsblank();

obspwrf(4095.0);
rgpulse(pwsl,three,0.,0.);
obspower(tpwrs1);
txphase(zero);

delay(2.0e-6);
rgradient('z',gzlv17);
delay(gt7);
rgradient('z',0.0);
delay(200.0e-6);

obspower(tsatpwr); /* Set transmitter power for 1H presaturation */
decpower(dhpwr); /* Set Dec1 power for 13C high power pulses */
dec2power(dhpwr2); /* Set Dec2 power for 15N hard pulses */
dec3power(dpwr3); /* Set Dec3 power for 2D decoupling */

```



```

/* 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);
decphase(zero);
delay(1.0e-5);

/* BEGIN ACTUAL SEQUENCE */
status(C);

/* Let the purge element phase-cycle together with initial DIPSI
   proton phase */
/* hl原因(ct,v3); */
hl原因(ct,v2);
mod2(v2,v1);

hl原因(ct,v2);
hl原因(v2,v3);
mod2(v3,v2);

/* Turn receiver off and hold the lock */
rcvoff();
lk_hold();

decpower(d_reb);
delay(20.0e-6);

rgpulse(pw,zero,0.0,0.0);

delay(taub
      -WFG2_START_DELAY - 202e-6 -2*GRADIENT_DELAY - gt1 -pwc_reb/2. );

delay(2.0e-6);
rgradient('z',gzlv11);
delay(gt1);
rgradient('z',0.0);
delay(200.0e-6);

simshaped_pulse("hard",shp_reb,2.*pw,pwc_reb,one,zero,0.,0.);
txphase(t3);

delay(taub - pwc_reb/2. - WFG2_STOP_DELAY - 202.e-6 -2*GRADIENT_DELAY - gt1 );

delay(2.0e-6);
rgradient('z',gzlv11);
delay(gt1);
rgradient('z',0.0);
delay(200.0e-6);

rgpulse(pw,t3,0.,0.);

decpower(dhpwr);

```

```

delay(2.0e-6);
rgradient('z',gzlv12);
delay(gt2);
rgradient('z',0.0);
delay(200.0e-6);

decrpulse(pwc,t2,0.,0.);
decpower(d_reb);

delay(taub - POWER_DELAY
      -WFG2_START_DELAY - 202e-6 -2*GRADIENT_DELAY - gt3 -pwc_reb/2. );

delay(2.0e-6);
rgradient('z',gzlv13);
delay(gt3);
rgradient('z',0.0);
delay(200.0e-6);

simshaped_pulse("hard",shp_reb,2.*pw,pwc_reb,one,zero,0.,0.);
decpower(dhpwr);

delay(taub - POWER_DELAY
      -pwc_reb/2. - WFG2_STOP_DELAY - 202.e-6 -2*GRADIENT_DELAY - gt3 -2.*POWER_DELAY );
delay(2.0e-6);
rgradient('z',gzlv13);
delay(gt3);
rgradient('z',0.0);
delay(200.0e-6);

decrpulse(pwc,zero,0.,0.);

decpower(dhpwr);
obspower(tpwrs1-3.);
txphase(one);

delay(2.0e-6);
rgradient('z',gzlv14);
delay(gt4);
rgradient('z',0.0);
delay(200.0e-6);

dec3power(dpwr3);
dec3rgpulse(pwd1,one,4.0e-6,0.);
dec3power(dpwr3_D);
dec3phase(zero);

txphase(one);
xmtron();
delay(time_equil/2.);
xmtoff();
txphase(one);
xmtron();
delay(time_equil/2.);
xmtoff();

obspower(tpwrs1); /* lower power */
obspwrf(tpwrs1_ffst); /* Set fine power for the last tcpmg delay */

rlpower(dpwr_cp,DODEV);
decrpulse(pwc_cp,t10,0.,0.);
decphase(one);
decpower(d_ca);

dec3power(dpwr3_D);

/* CPMG BEGIN */
if(ncyc<0){
    txphase(one);
    xmtron();

```

```

delay(D_delay);
dec3phase(zero);
dec3unblank();
dec3prgon(dec3pat,pwd,90.);
dec3on();
    delay(time_T2/2.-2*pwd_cp/PI-2*D_delay);
dec3off();
dec3prgoff();
dec3blank();
delay(D_delay);
};
if (ncyc > 0)    {

    txphase(one);
    xmtron();
    dec3phase(zero);

    delay(D_delay_f);

    dec3unblank();
    dec3prgon(dec3pat,pwd,90.);
    dec3on();
    delay(tauCPMG - (2/PI)*pwd_cp - 2.0e-6-POWER_DELAY - 2.*D_delay_f );
    dec3off();
    dec3prgoff();
    dec3blank();
    delay(D_delay_f-WFG_START_DELAY);

    xmtroff();
    obspwrf(tpwrs1_f);

    xmtron();
    decshaped_pulse(shp_ca,pwd_ca,one,0.,0.);

    delay(D_delay-WFG_STOP_DELAY);
    dec3unblank();
    dec3prgon(dec3pat,pwd,90.);
    dec3on();
        delay(tauCPMG-2.*D_delay);
    dec3off();
    dec3prgoff();
    dec3blank();
    delay(D_delay);

};

if(ncyc > 1)    {
    initval((ncyc-1),v4);
    loop(v4,v5);

    delay(D_delay);
    dec3unblank();
    dec3prgon(dec3pat,pwd,90.);
    dec3on();
        delay(tauCPMG-2.*D_delay);
    dec3off();
    dec3prgoff();
    dec3blank();
    delay(D_delay-WFG_START_DELAY);

    decshaped_pulse(shp_ca,pwd_ca,one,0.,0.);

    delay(D_delay-WFG_STOP_DELAY);
    dec3unblank();
    dec3prgon(dec3pat,pwd,90.);
    dec3on();
        delay(tauCPMG-2.*D_delay);
    dec3off();
    dec3prgoff();
    dec3blank();
    delay(D_delay);
};

```

```

    endloop(v5);
};
/* CPMG END */

/* Inversion pulse ( off-resonance effects etc. ) */
/* BEGIN */
if (ncyc!=0){
    xmtroff();

    rlpower(d_ca,DODEV);
    decphase(t6);

    initval(1.0,v3);
    decstepsize(phase_ca);
    dcplrphase(v3);

    delay(WFG_STOP_DELAY);
    decshaped_pulse(shp_ca,pwc_ca,t6,0.,0.);
    delay(WFG_START_DELAY);

    dcplrphase(zero);

    rlpower(dpwr_cp,DODEV);

    decphase(one);
    txphase(one);
    delay(0.5e-6);
    xmtron();
} else {

    rlpower(d_ca,DODEV);
    decphase(t6);

    initval(1.0,v3);
    decstepsize(phase_ca);
    dcplrphase(v3);

    delay(WFG_STOP_DELAY+0.5e-6);
    decshaped_pulse(shp_ca,pwc_ca,t6,0.,0.);
    delay(WFG_START_DELAY);

    dcplrphase(zero);

    rlpower(dpwr_cp,DODEV);

    decphase(one);
    txphase(one);
    delay(0.5e-6);

};
/* Inversion pulse END */

/* CPMG - BEGIN */
if(ncyc > 1) {
    initval((ncyc-1),v13);
    loop(v13,v14);

    delay(D_delay);
    dec3unblank();
    dec3prgon(dec3pat,pwd,90.);
    dec3on();
    delay(tauCPMG-2.*D_delay);
    dec3off();
    dec3prgoff();
    dec3blank();
    delay(D_delay-WFG_START_DELAY);

    decshaped_pulse(shp_ca,pwc_ca,one,0.,0.);

    delay(D_delay-WFG_STOP_DELAY);
    dec3unblank();
    dec3prgon(dec3pat,pwd,90.);
    dec3on();

```

```

    delay(tauCPMG-2.*D_delay);
    dec3off();
    dec3prgoff();
    dec3blank();
    delay(D_delay);

    endloop(v14);
};

if(ncyc > 0) {

    delay(D_delay);
    dec3unblank();
    dec3prgon(dec3pat,pwd,90.);
    dec3on();
    delay(tauCPMG-2.*D_delay);
    dec3off();
    dec3prgoff();
    dec3blank();
    delay(D_delay-WFG_START_DELAY);

    decshaped_pulse(shp_ca,pwc_ca,one,0.,0.);

    xmtroff();
    obspwrf(tpwrs1_ffst);

    txphase(one);
    xmtron();

    delay(D_delay_f-WFG_STOP_DELAY);
    dec3unblank();
    dec3prgon(dec3pat,pwd,90.);
    dec3on();
    delay(tauCPMG - (2/PI)*pwc_cp - 2.0e-6-POWER_DELAY -2*D_delay_f );
    dec3off();
    dec3prgoff();
    dec3blank();
    delay(D_delay_f);

    xmtroff();
};

if(ncyc<0){
    txphase(one);
    xmtron();
    delay(D_delay);
    dec3unblank();
    dec3prgon(dec3pat,pwd,90.);
    dec3on();
    delay(time_T2/2.-pwc_cp*2./PI-2*D_delay);
    dec3off();
    dec3prgoff();
    dec3blank();
    delay(D_delay);

    xmtroff();
};

decpower(dpwr_cp);
obspwrf(4095.0);
decrgpulse(pwc_cp,zero,2.0e-6,0.0);

decpower(dhpwr);

obspower(tpwrs1-3);
txphase(one);
xmtron();
delay(time_equil/2.);
xmtroff();
txphase(one);
xmtron();
delay(time_equil/2.);
xmtroff();
obspower(tpwr);

```

```

txphase(one);

dec3power(dpwr3);
dec3rgpulse(pwd1,three,2.e-6,0.);
dec3power(dpwr3_D);
dec3phase(zero);

decphase(t1);

/* purge deuterium before starting the lock
   (for probes where we do not align 2H magnetization before spin lock) */
delay(2.0e-6);
rgradient('z',gzlv10);
delay(gt0);
rgradient('z',0.0);
delay(500.0e-6);

rgpulse(pw,zero,0.,0.);
delay(10e-6);

/* Carbon excitation pulse */
if(opt_water[A]=='y'){
    decrgpulse(pwc,t11,0.,0.);
} else {
    decrgpulse(pwc,t1,0.,0.);
};
decpower(d_ca);
decphase(zero);

delay(taub - POWER_DELAY-202e-6 -2*GRADIENT_DELAY - gt5 -pwc_ca/2. - WFG2_START_DELAY );
delay(2.0e-6);
rgradient('z',gzlv15);
delay(gt5);
rgradient('z',0.0);
delay(200.0e-6);

simshaped_pulse("hard",shp_ca,2*pw,pwc_ca,one,zero,0.,0.);

delay(taub -pwc_ca/2. -WFG2_STOP_DELAY
      - 202e-6 -2*GRADIENT_DELAY - gt5 - 2.*pw - 3*POWER_DELAY - pws1
      - 2*POWER_DELAY -pwd1 - 4.0e-6 -POWER_DELAY );
/*      \- from decpower after 2*taul */

delay(2.0e-6);
rgradient('z',gzlv15);
delay(gt5);
rgradient('z',0.0);
delay(200.0e-6);

delay(2.*pw);

dec2power(dhpwr2);
decpower(dpwrcodec);

/* Turn on proton spin lock */
obspower(tpwrs1);
rgpulse(pws1,t4,0.,0.);
txphase(t12);
xmtron();

/* turn on carbonyl decoupling */
decprgon(codecseq,1.0/dmf_co,dresco);
decon();

/* turn on deuterium decoupling */
dec3phase(one);
dec3power(dpwr3);
dec3rgpulse(pwd1,one,4.0e-6,0.0);
dec3phase(zero);
dec3unblank();
dec3power(dpwr3_D);
dec3prgon("waltz16",pwd,90.);
dec3on();

```

```

delay(taul);
dec2rgpulse(2.*pwn,zero,0.,0.);
delay(taul);

decoff();
decprgoff();

decpower(dhpwr);
decrgpulse(pwc,t8,0.,0.);

/* Turn off deuterium decoupling */
dec3off();
dec3prgoff();
dec3blank();
dec3phase(three);
dec3power(dpwr3);
dec3rgpulse(pwd1,three,4.0e-6,0.0);

xmtroff();

obspower(tpwr);
decpower(d_reb);

delay(taub - 2*POWER_DELAY
      -WFG2_START_DELAY - 202e-6 -2*GRADIENT_DELAY - gt6 -pwc_reb/2. );

delay(2.0e-6);
rgradient('z',gzlv16);
delay(gt6);
rgradient('z',0.0);
delay(200.0e-6);

simshaped_pulse("hard",shp_reb,2.*pw,pwc_reb,one,zero,0.,0.);

delay(taub - pwc_reb/2. - WFG2_STOP_DELAY - 202.e-6 -2*GRADIENT_DELAY - gt6 -2.*POWER_DELAY );
delay(2.0e-6);
rgradient('z',gzlv16);
delay(gt6);
rgradient('z',0.0);
delay(200.0e-6-4.*pw/PI);

rgpulse(pw,zero,0.,0.);

decpower(dpwr); /* Set power for decoupling */
dec2power(dpwr2); /* Set power for decoupling */
lk_sample(); /* Turn on the lock */

/* BEGIN ACQUISITION */

status(D);
setreceiver(t7);
}
jcc 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 75
0
dpwrf 7 1 4095 0 1 2 1 2 0 64
1 4095
0
dfrq3 1 1 1000000000 0 0 2 1 9 1 64
1 91.9264956
0
crf 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0
0
axisf 4 2 4 0 0 4 1 0 1 64
1 "s"
4 "m" "n" "s" "u"
alfa 6 1 8192 -8192 1e-07 2 1 8194 1 64
1 6.6
0
acqdim 7 1 1000000000 -1000000000 0 2 1 0 1 64

```

```

1 2
0
acqcycles 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 64
0
acqstatus 7 1 32767 0 0 2 1 0 1 64
2 16 16
0
aig 2 2 2 0 0 4 1 1 1 64
1 "ai"
2 "nm" "ai"
array 2 2 256 0 0 2 1 1 1 64
1 "phase"
0
ampmode 2 2 8 0 0 2 1 0 1 64
1 "dddp"
0
alock 2 2 8 0 0 2 1 0 1 64
1 "n"
5 "a" "n" "s" "u" "y"
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,pwx1v1:0,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:DI
SPLAY:sp:1,wp:1,vs:0,sc:0,wc:0,hzmm:2,is:2,rfl:1,rfp:1,th:0,ins:3,aig*,dcg*,dmq*;"
0
at 1 1 14 14 14 2 1 8203 1 64
1 0.0639936
0
arrayelems 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 2
0
arraydim 7 1 32768 1 1 2 1 5 1 64
1 64
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
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
cal_pwc 2 2 8 0 0 2 1 0 1 64
1 "n"
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 0 64
1 8
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 0
0
codecsq 2 2 8 0 0 2 1 0 1 64
1 "co_dec_dfh"
0
cp 2 2 1 0 0 2 1 0 1 64

```



```
1 "y"
2 "y" "n"
console 2 2 8 0 0 2 1 0 1 64
1 "inova"
0
crl 1 1 1000000000 -1000000000 0 4 1 3 1 64
1 6993.10502569
0
cr 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 3027.09028621
0
dcodpwr 7 1 61 0 0 2 1 0 1 64
1 57
0
dataid 2 2 8 0 0 2 1 0 1 64
1 ""
0
d2 3 1 14 14 14 2 1 8194 1 64
1 0
0
cutoff 1 1 9.9999984307e+17 -9.9999984307e+17 0 4 1 0 0 64
1 200
0
ct 7 1 1000000000 0 1 2 1 6 1 64
1 0
0
d1 3 1 14 14 14 2 1 8194 1 64
1 2.5
0
d_sel 1 1 9 9 9 2 1 8192 1 64
1 50
0
d_ca 1 1 9.9999984307e+17 -9.9999984307e+17 0 2 1 0 1 64
1 61
0
d_reb 1 1 9.9999984307e+17 -9.9999984307e+17 0 2 1 0 1 64
1 45
0
dataProcessed 1 1 9.9999984307e+17 -9.9999984307e+17 0 3 1 0 1 64
1 0
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 "Sep 3 2008"
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"
dco90pwr 7 1 32767 0 0 2 1 0 1 64
1 52
0
deltaone 1 1 9.9999984307e+17 -9.9999984307e+17 0 2 1 0 1 64
1 0
0
deltaf 1 1 100 0 0 4 1 0 1 64
1 0.00296542986425
0
decfrq 1 1 9.9999984307e+17 -9.9999984307e+17 0 2 1 0 1 64
1 -3000
0
dcx 1 1 9.9999984307e+17 -9.9999984307e+17 0 2 1 0 1 64
1 -16
0
delta 1 1 9.9999984307e+17 -9.9999984307e+17 0 2 1 0 1 64
1 1569.54115197
0
deltafrq 5 1 1000000000 -1000000000 0 2 1 0 1 64
1 -19000
```

```

0
dfrq2 1 1 10000000000 0 0 2 1 9 1 64
1 60.6874499
0
dfrq 5 1 10000000000 -10000000000 0 2 1 8 1 64
1 150.5854527
0
dn 2 2 4 0 0 2 1 8 1 64
1 "C13"
0
dlowpwr 7 1 32767 0 0 2 1 0 1 64
1 46
0
dh2pwr 7 1 77 0 1 2 1 0 1 64
1 0
0
dg2 2 2 1023 0 0 4 1 7 1 64
1 "1:CHANNEL 2
PULSE:dfrq:7,dn,dof:1,dhpwr:0,pwc:2,dpwr_cp:0,pwc_cp:2,d_ca:0,pwc_ca:2,phase_ca:1,shp_ca,,d_reb:0,pwc_reb
:1,shp_reb,,;2:CHANNEL 2
DEC:dpwr:0,dseq,dm,dmm,dres,dmf,dpwr_codec,codecseq,dmf_co,dresco;3:GRADIENTS:gt0:5,gzlv10:0,gt1:5,gzlv11:
0,gt2:5,gzlv12:0,gt3:5,gzlv13:0;"
0
dgl 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:CH
ART:sc:0,wc:0,hzmm:2,vp:0,axis,pltmod,,th:0,,ho:2,vo:2,,rplot,trace:2;3(ni):2D:sp1:1,wpl:1,sc2:0,wc2:0,rf
l1:1,rfp1:1;3:FLAGS:aig*,dcg*,dmg*;3:FID:sf:3,wf:3,vf:0;4:INTEGRAL:intmod,is:2,ins:3,io:0,,lv1:3,tl1:3;"
0
dg 2 2 1023 0 0 4 1 6 1 64
1 "1:SAMPLE:date,sample,seqfil;1:2D ACQUISITION:sw:1,sw1:1,ni:0,phase:0,np:0,ss:0,nt:0,at:3,,;2:CHANNEL
1:sfrq:3,tn,tof:1,tpwr:0,tpwrs1:0,tsatpwr:0,pw:2,pws1:2,alfa:1;3:CHANNEL
3:dfrq2:3,dn2,dof2:1,dhpwr2:0,pwn:1,,;3:CHANNEL
4:dfrq3:3,dn3,dof3:1,dpwr3:0,dpwr3_D:0,pwd:2,pwd1:2;4:DELAYS:taub:5,d1:3,d2:6,time_T2,,;4:FLAGS:fsat,f1180
,ampmode,,;4:SPECIAL:gain:0,temp:1,ncyc;"
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,z3y: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
dhp 1 1 9 9 9 2 1 8192 0 64
1 40
0
dhipwr 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 63
0
dhpwr2 7 1 63 -16 1 2 1 2 1 64
1 -16
0
dhpwr 1 1 9 9 9 2 1 8192 1 64
1 63
0
disCmd 2 2 8 0 0 4 1 0 1 64
1 ""
0
dmf2 7 1 100000 1 0 2 1 2 1 64
1 1
0
dm3 4 2 4 0 0 2 1 0 1 64
1 "n"
4 "a" "n" "s" "y"
dm 4 2 4 0 0 2 1 0 1 64
1 "nnny"
4 "a" "n" "s" "y"
dlp 7 1 10 10 10 2 1 8194 0 64
1 10
0

```

```

dm2 2 2 8 0 0 2 1 0 1 64
1 "nnnn"
0
dmf 7 1 11 11 11 2 1 8194 1 64
1 8621
0
dmgl 2 2 8 0 0 4 1 0 1 64
1 ""
4 "" "av1" "ph1" "pwr1"
dmf_co 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 25000
0
dmf3 7 1 2000000 1 0 2 1 2 1 64
1 7092
0
dmg 2 2 2 0 0 4 1 3 1 64
1 "ph"
0
dmm2 2 2 8 0 0 2 1 0 1 64
1 "cccc"
0
dmm 4 2 4 0 0 2 1 0 1 64
1 "cccp"
9 "c" "f" "g" "m" "p" "r" "u" "w" "x"
dmm3 4 2 4 0 0 2 1 0 1 64
1 "c"
9 "c" "f" "g" "m" "p" "r" "u" "w" "x"
dotflag 2 2 8 0 0 4 1 0 1 64
1 "n"
2 "n" "y"
dof 5 1 8 8 8 2 1 8202 1 64
1 -7550.30344007
0
dn3 2 2 8 0 0 2 1 8 1 64
1 "H2"
0
dn2 2 2 8 0 0 2 1 8 1 64
1 "N15"
0
dod 3 1 14 14 14 2 1 8194 1 64
1 0.00999999977648
0
dof3 5 1 20 20 20 2 1 8202 1 64
1 -234.7
0
dof2 5 1 16 16 16 2 1 8202 1 64
1 1670.78663245
0
dpwr3 7 1 21 21 21 2 1 8194 1 64
1 59
0
dpwr 7 1 9 9 9 2 1 8194 1 64
1 44
0
dp 2 2 1 0 0 2 1 0 1 64
1 "y"
2 "y" "n"
dpwr2 7 1 18 18 18 2 1 8194 1 64
1 -16
0
dpwr_dip 1 1 9 9 9 2 1 8192 1 64
1 56
0
dpwr_cp 1 1 9 9 9 2 1 8192 1 64
1 61
0
dpwr3_D 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 51
0
dpwr_sl 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 48
0
dpwr_reb 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64

```

```

1 60
0
dpwrcodec 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 30
0
gtl 3 1 14 14 14 2 1 8192 1 64
1 0.00016
0
fnoesy 4 2 4 0 0 2 1 0 1 64
1 "n"
0
flcoef 2 2 8 0 0 3 1 1 1 64
1 ""
0
dseq3 2 2 8 0 0 2 1 0 1 64
1 ""
0
dres3 7 1 360 1 0 2 1 0 1 64
1 1
0
dres 7 1 360 1 0 2 1 0 1 64
1 90
0
dres2 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 "waltz16"
0
dresco 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 9
0
dseq2 2 2 8 0 0 2 1 0 1 64
1 ""
0
exppath 2 2 8 0 0 2 1 0 1 64
1 "/space/guest/vnmrsys/exp24/acqfil"
0
exp3D 2 2 8 0 0 2 1 0 1 64
1 "n"
0
explist 2 2 8 0 0 2 1 0 1 64
1 ""
0
fl180 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 "exp"
0
fad2 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
fb 7 1 6 6 6 2 1 8203 0 64
1 5000
0
fidid 2 2 8 0 0 2 1 0 1 64
1 ""
0
fmlev 4 2 4 0 0 2 1 0 1 64
1 "n"
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
flag3d 2 2 8 0 0 2 1 0 1 64
1 "y"

```

```
0
fnl 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
gfs 1 1 1000 -1000 0.001 3 1 1 0 64
1 0.003
0
fscuba 4 2 4 0 0 2 1 0 1 64
1 "n"
0
fpmultl 1 1 1000000000 0 0 3 1 0 1 64
1 1
0
fpmult 1 1 1000000000 0 0 3 1 0 1 64
1 0.5
0
fsat 2 2 8 0 0 2 1 0 1 64
1 "n"
0
gf 1 1 100000 0 0 3 1 1 0 64
1 0.0171710532159
0
gain 1 1 60 0 2 2 1 0 1 64
1 24
0
gfl 1 1 100000 0 0 3 1 1 0 64
1 0.0050210384652
0
gfs1 1 1 1000 -1000 0.001 3 1 1 0 64
1 0
0
gt0 3 1 32768 -32768 -1 2 1 8192 1 64
1 0.0015
0
ho 1 1 500 -500 0 4 1 1 1 64
1 -42.1666666667
0
gzlv11 1 1 32768 -32768 1 2 1 0 1 64
1 13000
0
gt5 3 1 14 14 14 2 1 8192 1 64
1 0.001
0
gt3 3 1 14 14 14 2 1 8192 1 64
1 0.00016
0
gt11 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 0.001
0
gt2 3 1 14 14 14 2 1 8192 1 64
1 0.0015
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 0.001
0
gt6 3 1 14 14 14 2 1 8192 1 64
1 0.0001504
0
gzlv10 1 1 32768 -32768 1 2 1 0 1 64
1 20000
0
gzlv14 1 1 32768 -32768 1 2 1 0 1 64
1 12000
0
```

gzlv12 1 1 32768 -32768 1 2 1 0 1 64
1 23000
0
gzlv110 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
0
gzlv111 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 10200
0
gzlv13 1 1 32768 -32768 1 2 1 0 1 64
1 15000
0
gzlv16 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 17800
0
gzlv15 1 1 32768 -32768 1 2 1 0 1 64
1 4000
0
gzlv17 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 12000
0
hzmm 1 1 1000000000 -1000000000 0 4 1 11 1 64
1 19.9922335984
0
homo3 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"
homo2 4 2 4 0 0 2 1 0 1 64
1 "n"
2 "n" "y"
hscuba 3 1 14 14 14 2 1 8192 1 64
1 0.03
0
hs 4 2 4 0 0 2 1 0 1 64
1 "nnyn"
2 "n" "y"
hst 3 1 0.02 0 2.5e-08 2 1 2 1 64
1 0.01
0
ins2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 100
0
in 4 2 1 0 0 2 1 0 1 64
1 "n"
3 "n" "w" "y"
il 2 2 1 0 0 2 1 0 1 64
1 "n"
2 "y" "n"
ins 3 1 8190 0 1e-07 4 1 3 1 64
1 100
0
intmod 2 2 8 0 0 4 1 0 1 64
1 "off"
3 "off" "partial" "full"
insref 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 0 64
1 1
0
ins2ref 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 0 64
1 1
0
io 1 1 500 -500 0.1 4 1 1 1 64
1 10
0
investigator 2 2 8 0 0 2 1 0 1 64
1 ""
0
is 1 1 1000000000 1e-06 0 4 1 3 1 64
1 4000
0
r6 1 1 1e+18 -1e+18 0 4 1 1 1 64

```

1 0
0
p1 6 1 13 13 13 2 1 8194 1 64
1 0
0
mixshift 3 1 14 14 14 2 1 8192 1 64
1 0
0
load 2 2 4 0 0 2 1 3 1 64
1 "n"
2 "y" "n"
lifrq 1 1 1000000000 -1000000000 0 4 1 0 1 64
7 4184.7535823 3445.32962737 3445.32962737 2811.537666 2811.537666 2072.11371107 0
0
lb 1 1 100000 -100000 0 3 1 1 0 64
1 30
0
jxh 7 1 32767 0 0 2 1 0 1 64
1 105
0
jnh 1 1 10000 80 0 2 1 1024 1 64
1 106
0
jxh2 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 94
0
lcpeak_ 7 1 32767 0 0 2 1 0 1 64
1 0
0
lb1 1 1 100000 -100000 0 3 1 1 1 64
1 10
0
liamp 1 1 1000000000 0 0 4 1 0 0 64
4 0 0 0 0.577882409096
0
llfrq 1 1 1000000000 -1000000000 0 4 1 0 0 64
1 0
0
llamp 1 1 1000000000 0 0 4 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
lp1 1 1 3600 -3600 0.1 4 1 3 1 64
1 -180
0
lockphase_ 1 1 360 0 1 2 1 16 1 64
1 257
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 36
0
lockpower_ 1 1 68 0 1 2 1 16 1 64
1 36
0
lp 1 1 3600 -3600 0.1 4 1 3 1 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
lsfrq 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
lvl 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 0.0059670781738
0
method 2 2 6 0 0 2 1 3 1 64
1 "/vnmr/shimmethods/zl2"
0
mcyc 7 1 32767 0 0 2 1 0 1 64
1 1
0
mixmlev 3 1 14 14 14 2 1 8192 1 64
1 0.02
0
mixnoe 3 1 14 14 14 2 1 8192 1 64
1 0.14
0
notebook 2 2 8 0 0 2 1 0 1 64
1 ""
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
mlevpwr 7 1 32767 0 0 2 1 0 1 64
1 50
0
ncyc_dipfinal 7 1 32767 0 0 2 1 0 1 64
1 2
0
n3 2 2 6 0 0 4 1 3 1 64
1 ""
0
ncyc 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 -1
0
ncyc_time 3 1 14 14 14 2 1 8192 1 64
1 0.005
0
ni 7 1 32767 0 0 2 1 0 1 64
1 32
0
osfb 1 1 100000 0 0 2 1 1 0 64
1 0
0
nt 7 1 1000000000 1 1 2 1 2 1 64
1 16
0
np 7 1 524288 32 2 2 1 11 1 64
1 1152
0
opt_water 2 2 8 0 0 2 1 0 1 64
1 "n"
0
offset_H 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
0
oscoef 7 1 49999 3 2 2 1 1 1 64
1 331
0
oslsfrq 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 1 0 64
1 0
0
osfilt 2 2 8 0 0 2 1 0 1 64
1 ""
5 "a" "A" "b" "B" ""

```



```
oversamp 7 1 68 0 1 2 1 9 1 64
1 44
0
pw90 6 1 13 13 13 2 1 8194 1 64
1 8.2
0
priority 7 1 32768 0 1 2 1 0 1 64
1 5
0
phfid 1 1 3600 -3600 0.1 3 1 0 0 64
1 0
0
parversion 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 4 1 64
1 5.1
0
page 2 2 8 0 0 2 1 0 1 64
1 ""
0
pad 3 1 14 14 14 2 1 8194 1 64
1 0
0
paramChanged 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
0
parstyle_ 2 2 8 0 0 4 1 0 1 64
1 "ppa"
0
phase_cpmg 1 1 360 -360 0.5 2 1 0 1 64
1 358
0
phase 7 1 4 0 1 2 1 0 1 64
2 1 2
0
phase_ca 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
0
phase_reb 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
0
pmode 2 2 8 0 0 3 1 0 1 64
1 "partial"
0
pkpick_ 2 2 8 0 0 4 1 0 1 64
1 ""
0
phfid1 1 1 3600 -3600 0.1 3 1 0 0 64
1 0
0
pltmod 2 2 8 0 0 4 1 0 1 64
1 "off"
5 "off" "fixed" "full" "variable" "user"
presat 3 1 14 14 14 2 1 8192 1 64
1 1.5
0
preacq 6 1 13 13 13 2 1 8192 0 64
1 0
0
procdim 7 1 1000000000 -1000000000 0 3 1 0 1 64
1 0
0
proc 2 2 10 0 0 3 1 1 1 64
1 "ft"
0
probe_ 2 2 8 0 0 2 1 8 1 64
1 ""
0
proc1 2 2 10 0 0 3 2 1 1 64
1 "ft"
0
purge_flg 2 2 8 0 0 2 1 0 1 64
1 "y"
0
pslabel 2 2 8 0 0 2 1 11 1 64
```

```
1 "CaHD_cpmg_GLY_dfh_600_v2"
0
processid 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
0
pw 6 1 13 13 13 2 1 8194 1 64
1 7.2625
0
pwmlev 6 1 13 13 13 2 1 8192 1 64
1 48.25
0
pwco180 6 1 13 13 13 2 1 8192 1 64
1 254
0
pwc_cp 6 1 13 13 13 2 1 8192 1 64
1 16.5
0
pwc 6 1 13 13 13 2 1 8192 1 64
1 13.5
0
pw_dip 6 1 13 13 13 2 1 8192 1 64
1 29.9
0
pwc_ca 6 1 13 13 13 2 1 8192 1 64
1 454
0
pwc_sel 6 1 13 13 13 2 1 8192 1 64
1 1776
0
pwc_reb 6 1 13 13 13 2 1 8192 1 64
1 2754
0
pwca 6 1 13 13 13 2 1 8192 1 64
1 50
0
pwcod 6 1 13 13 13 2 1 8192 1 64
1 234
0
pwco_sh 2 2 8 0 0 2 1 0 1 64
1 "herm180_17p6_750"
0
pwdl 6 1 13 13 13 2 1 8192 1 64
1 146.3
0
pwd 6 1 13 13 13 2 1 8192 1 64
1 335
0
pwh_sl 6 1 13 13 13 2 1 8192 1 64
1 19.3
0
pxcodec 6 1 13 13 13 2 1 8192 1 64
1 0
0
pwreb_cp 6 1 13 13 13 2 1 8192 1 64
1 354
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 0
0
pwx1 6 1 13 13 13 2 1 8192 1 64
1 36
0
pws1 6 1 13 13 13 2 1 8192 1 64
1 18.825
0
pwx2 6 1 13 13 13 2 1 8192 1 64
1 0
0
pwx1x 6 1 13 13 13 2 1 8192 1 64
1 1004
```

```
0
r2 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 17.675
0
r1 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 0.2
0
r4 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 0.0182848
0
r3 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 99.3962666667
0
r5 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 0.032
0
taum 3 1 14 14 14 2 1 8192 1 64
1 0.0007838
0
shape 2 2 8 0 0 2 1 0 1 64
1 "herml80_trc"
0
sb 1 1 1000 -1000 0.001 3 1 0 1 64
1 -0.08499999999999999
0
rp 1 1 3600 -3600 0.1 4 1 3 1 64
1 254.655614973
0
refsource1 2 2 8 0 0 4 1 0 1 64
1 "sfrq"
0
reffrq 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 598.843071801
0
rec_phase 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
0
r7 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 0
0
ref 5 1 10000000000 -10000000000 0 3 1 0 1 64
1 0
0
refpos 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0
0
reffrq1 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 125.5435963
0
refpos1 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 0 64
1 0
0
rfp 1 1 10000000000 -10000000000 0 4 1 1 1 64
1 0
0
rfl 1 1 10000000000 -10000000000 0 4 1 1 1 64
1 1655.7510448
0
rfband 4 2 4 0 0 2 1 0 1 64
1 "cccc"
3 "c" "h" "l"
rfl1 1 1 10000000000 -10000000000 0 4 1 1 1 64
1 1500.03750094
0
rof1 6 1 13 13 13 2 1 8194 1 64
1 0
0
rfp1 1 1 10000000000 -10000000000 0 4 1 1 1 64
1 7281.5285854
0
rof2 6 1 13 13 13 2 1 8194 1 64
1 2
0
```

```

satflg 2 2 8 0 0 2 1 0 1 64
1 "y"
0
sample 2 2 8 0 0 2 1 0 1 64
1 "t4199a"
0
rpl 1 1 3600 -3600 0.1 4 1 3 1 64
1 98
0
samplename 2 2 8 0 0 2 1 0 1 64
1 ""
0
satpwr 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 12
0
satfrq 5 1 1000000000 -1000000000 0 2 1 0 1 64
1 -9970
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
sf 1 1 8190 0 1e-07 4 1 3 1 64
1 0
0
sc 1 1 1 1 1 4 1 8195 1 64
1 6.25
0
sbs 1 1 1000 -1000 0.001 3 1 1 1 64
1 -0.0849999999999
0
sb1 1 1 1000 -1000 0.001 3 1 1 1 64
1 -0.0849999999999
0
sbs1 1 1 1000 -1000 0.001 3 1 1 1 64
1 -0.0849999999999
0
scf 1 1 1 0 0 2 1 0 1 64
1 0.45
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 "CaHD_cpmg_GLY_dfh_600_v2"
0
sel_car 2 2 8 0 0 2 1 0 1 64
1 "y"
0
sfrq 1 1 1000000000 0 0 2 1 11 1 64
1 598.8459165
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 "reb_on_ca"
0
sh_reb 2 2 8 0 0 2 1 0 1 64
1 "reb_on_ca"

```

```

0
spl 1 1 10000000000 -10000000000 0 4 1 3 1 64
1 5801.08478939
0
sn 1 1 1e+18 -1e+18 0 3 1 1 1 64
1 0
0
shp_ca 2 2 8 0 0 2 1 0 1 64
1 "CA_burp_dfh"
0
shims 2 2 8 0 0 2 1 0 1 64
1 ""
0
shp_sel 2 2 8 0 0 2 1 0 1 64
1 "reb_33pt4"
0
shp_reb 2 2 8 0 0 2 1 0 1 64
1 "reb_gly_on"
0
shp_x 2 2 8 0 0 2 1 0 1 64
1 "reb_on_dfh"
0
solvent 2 2 6 0 0 2 1 11 1 64
1 "d2o"
0
sp 1 1 10000000000 -10000000000 0 4 1 3 1 64
1 1458.0857295
0
ssorder 7 1 20 1 1 3 1 0 0 64
1 7
0
ss 7 1 32767 -32768 0 2 1 0 1 64
1 64
0
spin 1 1 32000000 0 0.1 2 1 0 0 64
1 0
0
sslsfrq 1 1 9.99999984307e+17 -9.99999984307e+17 0 3 1 0 0 64
1 0
0
ssfilter 1 1 50000 10 0.1 3 1 0 0 64
1 10
0
ssntaps 7 1 2500 0 1 3 1 0 1 64
1 121
0
swl 1 1 5000000 1 -2.5e-08 2 1 0 1 64
1 1253.99711581
0
sw 1 1 5 5 5 2 1 8203 1 64
1 9000.90009001
0
sspul 2 2 8 0 0 2 1 0 1 64
1 "n"
0
taua 3 1 14 14 14 2 1 8192 1 64
1 0.0016
0
t_dip 1 1 17 17 17 2 1 8192 1 64
1 50
0
taub 3 1 14 14 14 2 1 8192 1 64
1 0.0017543875
0
wexp 2 2 6 0 0 3 1 3 1 64
1 "kk_relax"
0
vo 1 1 500 -500 0 4 1 1 1 64
1 0
0
tn 2 2 4 0 0 2 1 8 1 64
1 "H1"
0

```

```
time_run 2 2 8 0 0 2 1 0 1 64
1 "20080903T191645"
0
time_T2 3 1 14 14 14 2 1 8192 1 64
1 0.014
0
th 1 1 1000000000 0 0 4 1 1 1 64
1 2
0
temp 1 1 200 -150 0.1 2 1 8 1 64
1 25
0
th2d 1 1 1 1e-18 0 4 1 17 1 64
1 0.8
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 "20080903T191644"
0
time_equil 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0.003
0
time_processed 2 2 8 0 0 3 1 0 1 64
1 ""
0
time_svfddate 2 2 8 0 0 2 1 0 1 64
1 "20080903T191644"
0
time_submitted 2 2 8 0 0 2 1 0 1 64
1 "20080903T191644"
0
time_saved 2 2 8 0 0 2 1 0 1 64
1 "20080903T191936"
0
time_submitted_local 2 2 8 0 0 2 1 0 1 64
1 "20080903T191644X07PMWedSep"
0
tlt 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 -0.0118805473903
0
tin 2 2 1 0 0 2 1 2 1 64
1 "y"
3 "n" "w" "y"
trace 2 2 2 0 0 4 1 3 1 64
1 "f2"
2 "f1" "f2"
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 -1555.25
0
tnsat 4 2 4 0 0 2 1 0 1 64
1 "y"
0
tpwrml 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 47
0
tpwrf 7 1 4095 0 1 2 1 2 0 64
1 4095
0
tpwrs1 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 55
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
vf 1 1 1000000000 0 0 4 1 3 1 64
```

```
1 590153.048397
0
username 2 2 8 0 0 2 1 0 1 64
1 "guest"
0
vloc_ 2 2 8 0 0 2 1 8 1 64
1 "C7"
0
vsproj 1 1 1000000000 1e-06 0 4 1 3 1 64
1 23656.8943479
0
vpfi 1 1 500 -500 0 4 1 0 1 64
1 0
0
vpf 1 1 500 -500 0 4 1 0 1 64
1 16.1448614824
0
vp 7 1 500 -500 0.1 4 1 3 1 64
1 43.8855400571
0
vs 1 1 1000000000 1e-06 0 4 1 3 1 64
1 661059.542678
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
vs2d 1 1 1000000000 1e-06 0 4 1 3 1 64
1 104978.618477
0
wbs 2 2 6 0 0 3 1 3 1 64
1 ""
0
vtwait 3 1 14 14 14 2 1 8194 1 64
1 180
0
vtc 1 1 255 0 1 2 1 2 1 64
1 0
0
vzone_ 7 1 15 1 0 2 1 0 1 64
1 1
0
wc2 1 1 4 4 4 4 1 8195 1 64
1 130
0
wc 1 1 2 2 2 4 1 8203 1 64
1 225
0
wdone 2 2 8 0 0 3 1 0 1 64
1 "acqdone"
0
werr 2 2 6 0 0 3 1 3 1 64
1 ""
0
z1 7 1 19 19 19 2 1 8192 1 64
1 13242
0
wtfile1 2 2 15 0 0 3 2 1 1 64
1 ""
0
wp 1 1 5000000 0 0 4 1 11 1 64
1 1569.00455671
0
wf1 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0.0510367999999
0
wf 1 1 8190 0 1e-07 4 1 3 1 64
1 0.0639936
0
wnt 2 2 6 0 0 3 1 3 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"
wpl 1 1 100000 0 0 4 1 3 1 64
1 1195.21600101
0
wtfile 2 2 15 0 0 3 1 1 1 64
1 ""
0
xz2 7 1 19 19 19 2 1 8192 1 64
1 1657
0
x4 7 1 19 19 19 2 1 8192 1 64
1 0
0
x2y2 7 1 19 19 19 2 1 8192 1 64
1 -2696
0
x1 7 1 19 19 19 2 1 8192 1 64
1 -1526
0
x3 7 1 19 19 19 2 1 8192 1 64
1 5285
0
xy 7 1 19 19 19 2 1 8192 1 64
1 2398
0
xdiaq 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 -1444
0
yz 7 1 19 19 19 2 1 8192 1 64
1 -2634
0
y3 7 1 19 19 19 2 1 8192 1 64
1 3857
0
y1 7 1 19 19 19 2 1 8192 1 64
1 1656
0
y4 7 1 19 19 19 2 1 8192 1 64
1 0
0
yz2 7 1 19 19 19 2 1 8192 1 64
1 10906
0
z0_ 1 1 19 19 19 2 1 8208 1 64
1 -12932
0
z4 7 1 19 19 19 2 1 8192 1 64
1 3300
0
z3 7 1 19 19 19 2 1 8192 1 64
1 1015
0
z2x2y2 7 1 19 19 19 2 1 8192 1 64
1 -8497
0
z2 7 1 19 19 19 2 1 8192 1 64
1 -4355
0
z1c 7 1 19 19 19 2 1 8192 1 64
1 0
0
z2c 7 1 19 19 19 2 1 8192 1 64
1 0
0
z2xy 7 1 19 19 19 2 1 8192 1 64
1 -4474
0

```


z2x3 7 1 19 19 19 2 1 8192 1 64
1 4562
0
z2y3 7 1 19 19 19 2 1 8192 1 64
1 1518
0
z3x3 7 1 19 19 19 2 1 8192 1 64
1 -440
0
z3x 7 1 19 19 19 2 1 8192 1 64
1 4903
0
z3c 7 1 19 19 19 2 1 8192 1 64
1 0
0
z3x2y2 7 1 19 19 19 2 1 8192 1 64
1 -1232
0
z3y 7 1 19 19 19 2 1 8192 1 64
1 -8662
0
z3xy 7 1 19 19 19 2 1 8192 1 64
1 -2734
0
z3y3 7 1 19 19 19 2 1 8192 1 64
1 -2324
0
z5y 7 1 19 19 19 2 1 8192 1 64
1 5691
0
z4xy 7 1 19 19 19 2 1 8192 1 64
1 1609
0
z4x 7 1 19 19 19 2 1 8192 1 64
1 1243
0
z4c 7 1 19 19 19 2 1 8192 1 64
1 0
0
z4x2y2 7 1 19 19 19 2 1 8192 1 64
1 -2702
0
z5 7 1 19 19 19 2 1 8192 1 64
1 5696
0
z4y 7 1 19 19 19 2 1 8192 1 64
1 42
0
z5x 7 1 19 19 19 2 1 8192 1 64
1 -2185
0
z8 7 1 19 19 19 2 1 8192 1 64
1 0
0
z7 7 1 19 19 19 2 1 8192 1 64
1 0
0
z6 7 1 19 19 19 2 1 8192 1 64
1 -9035
0
zx3 7 1 19 19 19 2 1 8192 1 64
1 571
0
zx2y2 7 1 19 19 19 2 1 8192 1 64
1 162
0
zxy 7 1 19 19 19 2 1 8192 1 64
1 12677
0
zy3 7 1 19 19 19 2 1 8192 1 64
1 2167
0

```

/* Ha_SQ_exchange_lek_600_GLY.c

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

2D C13,1H correlation map to observe exchange with variable CPMG spacing
Used to record 1H dispersions of Ha

Uses two channels:
1) 1H          - 4.73 ppm or methyl region
2) 13C         - 58 ppm (Ca region)

Set dm = 'nnny', dmm = 'cccp' [13C decoupling during acquisition].
Set dm2 = 'nnnn', dmm2 = 'cccp'.

Must set phase = 1,2 for States-TPPI acquisition in t1 [13C].

Written by L.E.Kay on Aug 6, 2008 from Ha_SQ_exchange_lek_600_v2.c

--- sequence only for GLY residues (does not attempt to suppress CH2, since this would
    require further 1/JHC delays during which signal relaxes.

Use a 3 ms reburp pulse (at 600 MHz) centered at 45 ppm (GLY).

Make sure that the 2H hard pulses are turned off at the 800!

Set MQ_flg to y if you want MQ evolution during t1

Modified by D.F Hansen on August 8 2008
    Include a filter to remove CH2 in 1/(2*J).
*/

#include <standard.h>

static int  phil[4] = {0,0,2,2},
            phi2[2] = {0,2},
            phi4[8] = {0,0,0,0,2,2,2,2},
            rec[4]  = {0,2,2,0};

static double d2_init=0.0;

pulsesequence()
{
/* DECLARE VARIABLES */

char      fsat[MAXSTR],
          fscuba[MAXSTR],
          fl180[MAXSTR], /* Flag to start t1 @ halfdwell */
          sh_reb[MAXSTR],
          codec[MAXSTR],
          MQ_flg[MAXSTR],
          filter_flg[MAXSTR];

int        phase,
          t1_counter; /* used for states tpqi in t1 */

double     taul, /* t1 delay */
          taua, /* set to exactly 1/4JCH */
          tsatpwr, /* low level 1H trans.power for presat */
          sw1, /* sweep width in f1 */

          tpwr_cp, /* power level for 1H CPMG */
          pw_cp, /* 1H pw for CPMG */

          ncyc_cp, /* number of CPMG cycles */
          time_T2, /* total time for CPMG trains */
          tau_cpmg,

          dhpwr,
          pwc,

          dmf_co,
          dpwr_co,
          dresco,

```

```

        gt0,
        gt1,
        gt2,
        gt3,
        gt4,
        gt5,
        gt6,

        gzlv10,
        gzlv11,
        gzlv12,
        gzlv13,
        gzlv14,
        gzlv15,
        gzlv16,

        tpwr,
        pw,

        d_reb,
        pwc_reb,

        dpwr3_D,
        pwd,
        pwd1,

        tau_eq,

        pwn,
        dhpwr2;

/* LOAD VARIABLES */

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

getstr("sh_reb",sh_reb);

getstr("codec",codec);

getstr("MQ_flg",MQ_flg);
getstr("filter_flg",filter_flg);

taua  = getval("taua");
tpwr = getval("tpwr");
tsatpwr = getval("tsatpwr");
dpwr = getval("dpwr");
phase = (int) ( getval("phase") + 0.5);
sw1 = getval("sw1");

tpwr_cp = getval("tpwr_cp");
pw_cp = getval("pw_cp");
ncyc_cp = getval("ncyc_cp");
time_T2 = getval("time_T2");

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

pwn = getval("pwn");
dhpwr2 = getval("dhpwr2");

dmf_co = getval("dmf_co");
dpwr_co = getval("dpwr_co");
dresco = getval("dresco");

gt0 = getval("gt0");
gt1 = getval("gt1");
gt2 = getval("gt2");
gt3 = getval("gt3");
gt4 = getval("gt4");
gt5 = getval("gt5");

```

```

gt6 = getval("gt6");

gzlv10 = getval("gzlv10");
gzlv11 = getval("gzlv11");
gzlv12 = getval("gzlv12");
gzlv13 = getval("gzlv13");
gzlv14 = getval("gzlv14");
gzlv15 = getval("gzlv15");
gzlv16 = getval("gzlv16");

tpwr = getval("tpwr");
pw = getval("pw");

d_reb = getval("d_reb");
pwc_reb = getval("pwc_reb");

dpwr3_D = getval("dpwr3_D");
pwd = getval("pwd");
pwd1 = getval("pwd1");

tau_eq = getval("tau_eq");

/* LOAD PHASE TABLE */

settable(t1,4,phi1);
settable(t2,2,phi2);
settable(t4,8,phi4);
settable(t5,4,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' || dm2[D] == 'y'))
{
    printf("incorrect dec2 decoupler flags! ");
    abort(1);
}

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

if( dpwr > 48 )
{
    printf("don't fry the probe, DPWR too large! ");
    abort(1);
}

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

if(pw_cp < 9.5e-6) {
    printf("pw_cp is too low; > 9.5us\n");
    abort(1);
}

if( dpwr2 > -16 )
{
    printf("don't fry the probe, DPWR2 too large! ");
    abort(1);
}

```

```

if( pw > 20.0e-6 )
{
    printf("dont fry the probe, pw too high ! ");
    abort(1);
}

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

{
    printf("gradients on for too long. Must be < 3e-3 \n");
    abort(1);
}

if(ncyc_cp > 80) {
    printf("ncyc_cp is too large; must be less than 81\n");
    abort(1);
}

if(time_T2 > .080) {
    printf("time_T2 is too large; must be less than 80 ms\n");
    abort(1);
}

if(ncyc_cp > 0) {
    tau_cpmg = time_T2/(4.0*ncyc_cp) - pw_cp;
    if(ix==1)
        printf("nuCPMG for curent experiment is (Hz): %5.3f\n",1/(4.0*(tau_cpmg+pw_cp)));
    else {
        tau_cpmg = time_T2/(4.0) - pw_cp;
        if(ix==1)
            printf("nuCPMG for curent experiment is (Hz): not applicable");
    }
}

if(tau_cpmg + pw_cp < 125e-6) {
    printf("tau_cpmg is too small; decrease ncyc_cp\n");
    abort(1);
}

if(dpwr_co > 42) {
    printf("dpwr_co is too high; < 42\n");
    abort(1);
}

if(dpwr3_D > 51) {
    printf("dpwr3_D is too high; < 52\n");
    abort(1);
}

if(dpwr3 > 59) {
    printf("dpwr3 is too high; < 60\n");
    abort(1);
}

if(ix==1)
    printf("If at 800 turn dpwr3=-16, pwd1=0\n");

/* Phase incrementation for hypercomplex 2D data */

if (phase == 2)
    tsadd(t1,1,4);

/* Set up fl180   tau1 = t1 */

tau1 = d2;

if(MQ_flg[A] == 'n')
    tau1 = tau1 - 4.0/PI*pwc - POWER_DELAY - PRG_START_DELAY
        - 2.0*pw - 2.0*pwn - PRG_STOP_DELAY - POWER_DELAY
        - 4.0e-6;
else
    tau1 = tau1 - 4.0/PI*pwc - POWER_DELAY - PRG_START_DELAY

```

```

        - 2.0*pw - 2.0*pwn - PRG_STOP_DELAY - POWER_DELAY
        - 4.0e-6;

if(f1180[A] == 'y') {
    tau1 += ( 1.0 / (2.0*sw1));
    if(tau1 < 0.4e-6) tau1 = 0.4e-6;
}

if(tau1 < 0.4e-6)
    tau1 = 0.4e-6;

    tau1 = tau1/2.0;

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

if( ix == 1) d2_init = d2 ;
tl_counter = (int) ( (d2-d2_init)*sw1 + 0.5 );
if(tl_counter % 2) {
    tsadd(tl,2,4);
    tsadd(t5,2,4);
}

/* BEGIN ACTUAL PULSE SEQUENCE */

status(A);

    rlpower(tsatpwr,TODEV);      /* Set transmitter power for 1H presaturation */
    rlpower(dhpwr,DODEV);        /* Set Dec1 power for 13C pulses */
    rlpower(dhpwr2,DO2DEV);      /* Set Dec2 power for 15N pulses */

    obsoffset(tof);

/* Presaturation Period */

status(B);

if (fsat[0] == 'y')
{
    delay(2.0e-5);
    rgpulse(d1,zero,2.0e-6,2.0e-6); /* presaturation */
    rlpower(tpwr,TODEV); /* 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);
}

    rlpower(tpwr,TODEV);          /* Set transmitter power for 1H CPMG pulses */
    txphase(zero);
    dec2phase(zero);
    decphase(zero);
    delay(1.0e-5);

/* Begin Pulses */

status(C);

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

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

```

```

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

rgpulse(pw,zero,0.0,0.0);

decpower(d_reb);

delay(2.0e-6);
rgradient('z',gzlvl2);
delay(gt2);
rgradient('z',0.0);
delay(150.0e-6);

if(filter_flg[A] == 'y')
    delay(taua - POWER_DELAY - gt2 - 152e-6
        - WFG2_START_DELAY - 0.5*psc_reb - 4.0/PI*pw);

else
    delay(taua - POWER_DELAY - gt2 - 152e-6
        - WFG2_START_DELAY - 0.5*psc_reb);

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

decpower(dhpwr);
decphase(t4);

delay(taua - 0.5*psc_reb - WFG2_STOP_DELAY - POWER_DELAY - gt2 - 152e-6 );

delay(2.0e-6);
rgradient('z',gzlvl2);
delay(gt2);
rgradient('z',0.0);
delay(150.0e-6);

if(filter_flg[A] == 'n')
    rgpulse(pw,one,0.0,0.0);

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

decrpulse(psc,t4,0.,0.);

decpower(d_reb);
decphase(zero);

delay(2.0e-6);
rgradient('z',gzlvl0);
delay(gt0);
rgradient('z',0.0);
delay(150.0e-6);

delay(taua - POWER_DELAY - gt0 - 152e-6
    - WFG2_START_DELAY - 0.5*psc_reb);

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

decpower(dhpwr);
decphase(t4);

delay(taua - 0.5*psc_reb - WFG2_STOP_DELAY - POWER_DELAY - gt0 - 152e-6 );

delay(2.0e-6);
rgradient('z',gzlvl0);
delay(gt0);
rgradient('z',0.0);
delay(150.0e-6);

decrpulse(psc,t4,0.0,0.0);
rgpulse(pw,one,0.0,0.0);

```

```

}

decphase(t1);

delay(2.0e-6);
rgradient('z',gzlv13);
delay(gt3);
rgradient('z',0.0);
delay(250.0e-6);

/* turn on 2H decoupling */

dec3phase(one);
dec3power(dpwr3);
dec3rgpulse(pwd1,one,4.0e-6,0.0);
dec3phase(zero);
dec3unblank();
dec3power(dpwr3_D);
dec3prgon(dseq3,pwd,dres3);
dec3on();

/* turn on 2H decoupling */

if(MQ_flg[A] == 'y') {
    rgpulse(pw,zero,2.0e-6,0.0);
    delay(2.0*pwn - PRG_START_DELAY - PRG_STOP_DELAY);
}

decrgpulse(pwc,t1,4.0e-6,0.0);
decphase(zero);

/* 13CO decoupling on */
decpower(dpwr_co);
decprgon(codec,1.0/dmf_co,dresco);
decon();
/* 13CO decoupling on */

delay(taul);

rgpulse(2.0*pw,zero,0.0,0.0);
dec2rgpulse(2.0*pwn,zero,0.0,0.0);

delay(taul);

/* 13CO decoupling off */
decoff();
decprgoff();
/* 13CO decoupling off */

decpower(dhpwr);

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

if(MQ_flg[A] == 'y')
    rgpulse(pw,zero,0.0,0.0);

/* turn off decoupling */

dec3off();
dec3prgoff();
dec3blank();
dec3phase(three);
dec3power(dpwr3);
dec3rgpulse(pwd1,three,4.0e-6,0.0);

/* turn off decoupling */

obspower(tpwr_cp);

if(MQ_flg[A] == 'n') {

```



```

delay(2.0e-6);
rgradient('z',gzlvl4);
delay(gt4);
rgradient('z',0.0);
delay(250.0e-6);

}

else {

    delay(2.0e-6);
    rgradient('z',-1.0*gzlvl4);
    delay(gt4);
    rgradient('z',0.0);
    delay(250.0e-6);

}

/* now include a delay to allow the spin system to equilibrate */

delay(tau_eq);

rgpulse(pw_cp,t2,4.0e-6,0.0);
txphase(one);

/* start of the CPMG period 1 */

if(ncyc_cp == 1) {
    delay(tau_cpmg - (2.0/PI)*pw_cp);
    rgpulse(2.0*pw_cp,one,0.0,0.0);
    delay(tau_cpmg);
}

if(ncyc_cp == 2) {
    delay(tau_cpmg - (2.0/PI)*pw_cp);
    rgpulse(2.0*pw_cp,one,0.0,0.0);
    delay(tau_cpmg);
    delay(tau_cpmg);
    rgpulse(2.0*pw_cp,one,0.0,0.0);
    delay(tau_cpmg);
}

if(ncyc_cp > 2) {
    delay(tau_cpmg - (2.0/PI)*pw_cp);
    rgpulse(2.0*pw_cp,one,0.0,0.0);
    delay(tau_cpmg);

    initval(ncyc_cp-2,v4);
    loop(v4,v5);
        delay(tau_cpmg);
        rgpulse(2.0*pw_cp,one,0.0,0.0);
        delay(tau_cpmg);
    endloop(v5);

    delay(tau_cpmg);
    rgpulse(2.0*pw_cp,one,0.0,0.0);
    delay(tau_cpmg);
}

txphase(t4); decphase(zero);

rgpulse(2.0*pw_cp,t4,2.0e-6,2.0e-6);
txphase(one);

if(ncyc_cp == 1) {
    delay(tau_cpmg);
    rgpulse(2.0*pw_cp,one,0.0,0.0); txphase(one);
    delay(tau_cpmg - 2.0/PI*pw_cp);
}

if(ncyc_cp == 2) {
    delay(tau_cpmg);

```

```

    rgpulse(2.0*pw_cp,one,0.0,0.0);
    delay(tau_cpmg);
    delay(tau_cpmg);
    rgpulse(2.0*pw_cp,one,0.0,0.0); txphase(one);
    delay(tau_cpmg - 2.0/PI*pw_cp);
}

if(ncyc_cp > 2) {
    delay(tau_cpmg);
    rgpulse(2.0*pw_cp,one,0.0,0.0);
    delay(tau_cpmg);

    initval(ncyc_cp-2,v4);
    loop(v4,v5);
        delay(tau_cpmg);
        rgpulse(2.0*pw_cp,one,0.0,0.0);
        delay(tau_cpmg);
    endloop(v5);

    delay(tau_cpmg);
    rgpulse(2.0*pw_cp,one,0.0,0.0); txphase(one);
    delay(tau_cpmg - 2.0/PI*pw_cp);
}

rgpulse(pw_cp,zero,0.0,0.0);

delay(2.0e-6);
rgradient('z',gzlvl5);
delay(gt5);
rgradient('z',0.0);
delay(250.0e-6);

obspower(tpwr);

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

decpower(d_reb);

delay(2.0e-6);
rgradient('z',gzlvl6);
delay(gt6);
rgradient('z',0.0);
delay(150.0e-6);

delay(taua - POWER_DELAY - gt6 - 152e-6
      - WFG2_START_DELAY - 0.5*pwd_reb);

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

delay(taua - 0.5*pwd_reb - WFG2_STOP_DELAY - 2.0*POWER_DELAY - gt6 - 152e-6);

rlpower(dpwr,DODEV); /* Set power for decoupling */
rlpower(dpwr2,D02DEV); /* Set power for decoupling */

delay(2.0e-6);
rgradient('z',gzlvl6);
delay(gt6);
rgradient('z',0.0);
delay(150.0e-6);

rgpulse(pw,zero,0.0,0.0);

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

/* BEGIN ACQUISITION */

status(D);
    setreceiver(t5);
}
lb1 1 1 100000 -100000 0 3 1 1 0 64
1 0.318309992552
0
dotflag 2 2 8 0 0 4 1 0 1 64

```

```

1 "n"
2 "n" "y"
deltafrq 5 1 1000000000 -1000000000 0 2 1 0 1 64
1 -19000
0
crl 1 1 1000000000 -1000000000 0 4 1 3 1 64
1 7136.00117054
0
axisf 4 2 4 0 0 4 1 0 1 64
1 "s"
4 "m" "n" "s" "u"
arrayelems 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 3
0
alfa 6 1 8192 -8192 1e-07 2 1 8194 1 64
1 6.6
0
acqstatus 7 1 32767 0 0 2 1 0 1 64
2 101 18
0
acqcycles 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 896
0
MQ_flg 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
aig 2 2 2 0 0 4 1 1 1 64
1 "ai"
2 "nm" "ai"
ampmode 2 2 8 0 0 2 1 0 1 64
1 "dddp"
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 "ncyc_cp,phase"
0
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,pwx1vl: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:DI
SPLAY:sp:1,wp:1,vs:0,sc:0,wc:0,hzmm:2,is:2,rfl:1,rfp:1,th:0,ins:3,aig*,dcg*,dmq*;"
0
arraydim 7 1 32768 1 1 2 1 5 1 64
1 896
0
awc 1 1 1 -1 0.001 3 1 1 0 64
1 0
0
at 1 1 14 14 14 2 1 8203 1 64
1 0.0639936
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"
console 2 2 8 0 0 2 1 0 1 64
1 "inova"
0
celem 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64

```

```
1 896
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 0 64
1 32
0
codec 2 2 8 0 0 2 1 0 1 64
1 "co_decoup_dfh"
0
cf 7 1 32767 0 1 3 1 1 0 64
1 1
0
cofrq 5 1 1000000000 -1000000000 0 2 1 0 1 64
1 10800
0
cr 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 3451.09328342
0
cp 2 2 1 0 0 2 1 0 1 64
1 "y"
2 "y" "n"
dco90pwr 7 1 32767 0 0 2 1 0 1 64
1 52
0
d_reb 7 1 9 9 9 2 1 8192 1 64
1 44
0
ct 7 1 1000000000 0 1 2 1 6 1 64
1 64
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
d2 3 1 14 14 14 2 1 8194 1 64
1 0
0
date 2 2 9 0 0 2 1 1 1 64
1 "Aug 8 2008"
0
dataid 2 2 8 0 0 2 1 0 1 64
1 ""
0
dataProcessed 1 1 9.99999984307e+17 -9.99999984307e+17 0 3 1 0 1 64
1 0
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"
delta 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 3353.36268002
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
delta1 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 1185.86987755
0
dmf3 7 1 2000000 1 0 2 1 2 1 64
1 7092
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,z3y: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
dgl 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,rpl(ni):1,lp1(ni):1;2:CH
ART:sc:0,wc:0,hzmm:2,vp:0,axis,pltm,,th:0,,ho:2,vo:2,,rplot,trace:2;3(ni):2D:spl:1,wpl:1,sc2:0,wc2:0,rf
l1:1,rfl1:1;3:FLAGS:aig*,dcg*,dmg*;3:FID:sf:3,wf:3,vf:0;4:INTEGRAL:intmod,is:2,ins:3,io:0,,lvl:3,tl:3;"
0
dfrq3 1 1 1000000000 0 0 2 1 9 1 64
1 91.9264953
0
dfrq 5 1 1000000000 -1000000000 0 2 1 8 1 64
1 150.5856108
0
deltaone 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
0
dfrq2 1 1 1000000000 0 0 2 1 9 1 64
1 60.6874503
0
dg 2 2 1023 0 0 4 1 6 1 64
1 "1:SAMPLE:date;1:3D
ACQUISITION:sw:1,swl:1,ni:0,phase:0,np:0,ss:0,nt:0,at:3;2:SPECIAL:gain,temp:1,ncyc_cp:0,seqfil,time_T2;2:
DELAYS:taua:5,tau_eq:5,d1:3,d2:6,tin,vtwait;3:CHANNEL
1:sfrq:3,tn,tof:1,tpwr:0,tpwr_cp:0,tsatpwr:0,pw:2,pw_cp:2,alfa:1;3:FLAGS:fsat,fscuba,f1180,MQ_flg,filter_
flg;4:CHANNEL 3:dfrq2:3,dn2,dof2:1,pwn:1,dhpwr2:0,dpwr2:0,dm2,dmm2,dmf2,dseq2,dres2;"
0
dg2 2 2 1023 0 0 4 1 7 1 64
1 "1:CHANNEL
2:dfrq:3,dn,dof:1,dhpwr:0,pwc:1,d_reb:0,sh_reb,pwc_reb:1,dpwr:0,codec,dmf_co,dpwr_co:0,dresco,dseq,dm,dmm
,dres,dmf;2:GRADIENTS:gt1:4,gzlv1:0,gt2:4,gzlv2:0,gt3:4,gzlv3:0,gt4:4,gzlv4:0,gt5:4,gzlv5:0,gt6:4,gz
lv6:0;3:CHANNEL 4:dfrq3:3,dn3,dof3:1,dpwr3:0,dpwr3_D:0,pwd:1,pwd1:1,dseq3,dres3,dm3,dmm3;"
0
dglp 2 2 8 0 0 4 1 7 1 64
1 "1(lpfilt):LP:lpalg,lpopt,lpfilt:0,lpnupts:0,strt1p:0,lpext:0,strttext:0;2(lpfilt1):LP
1:lpalg1,lpopt1,lpfilt1:0,lpnupts1:0,strt1p1:0,lpext1:0,strttext1:0;3(lpfilt2):LP
2:lpalg2,lpopt2,lpfilt2:0,lpnupts2:0,strt1p2:0,lpext2:0,strttext2:0;4:LP
OUTPUT:lpprint(lpfilt):0,lptrace(lpfilt):0,lpprint1(lpfilt1):0,lptrace1(lpfilt1):0,lpprint2(lpfilt2):0,lp
trace2(lpfilt2):0;"
0
disCmd 2 2 8 0 0 4 1 0 1 64
1 ""
0
dhpwr 1 1 9 9 9 2 1 8192 1 64
1 63
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
dhpwr2 1 1 18 18 18 2 1 8192 1 64
1 61
0

```

```

dm2 2 2 8 0 0 2 1 0 1 64
1 "nnnn"
0
dlp 7 1 10 10 10 2 1 8194 0 64
1 10
0
dlowpwr 7 1 32767 0 0 2 1 0 1 64
1 46
0
dm 4 2 4 0 0 2 1 0 1 64
1 "nnny"
4 "a" "n" "s" "y"
dmf 7 1 11 11 11 2 1 8194 1 64
1 7634
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 3759
0
dn2 2 2 8 0 0 2 1 8 1 64
1 "N15"
0
dmm 4 2 4 0 0 2 1 0 1 64
1 "cccw"
9 "c" "f" "g" "m" "p" "r" "u" "w" "x"
dmg 2 2 2 0 0 4 1 3 1 64
1 "ph"
0
dmf_co 7 1 11 11 11 2 1 8192 1 64
1 25000
0
dmgl 2 2 8 0 0 4 1 0 1 64
1 ""
4 "" "av1" "ph1" "pwr1"
dmm3 4 2 4 0 0 2 1 0 1 64
1 "cccc"
9 "c" "f" "g" "m" "p" "r" "u" "w" "x"
dmm2 2 2 8 0 0 2 1 0 1 64
1 "cccc"
0
dn 2 2 4 0 0 2 1 8 1 64
1 "C13"
0
dof 5 1 8 8 8 2 1 8202 1 64
1 -7392.22015531
0
dod 3 1 14 14 14 2 1 8194 1 64
1 0.00999999977648
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 1671.2
0
gt6 3 1 14 14 14 2 1 8192 1 64
1 0.0001
0
fidid 2 2 8 0 0 2 1 0 1 64
1 ""
0
dseq3 2 2 8 0 0 2 1 0 1 64
1 "waltz16"
0
dpwrf 7 1 4095 0 1 2 1 2 0 64
1 4095
0
dpwr3 7 1 21 21 21 2 1 8194 1 64

```

```
1 59
0
dpwr 7 1 9 9 9 2 1 8194 1 64
1 43
0
dp 2 2 1 0 0 2 1 0 1 64
1 "y"
2 "y" "n"
dpwr2 7 1 18 18 18 2 1 8194 1 64
1 -16
0
dpwr_co 1 1 9 9 9 2 1 8192 1 64
1 29
0
dpwr3_D 7 1 21 21 21 2 1 8192 1 64
1 50
0
dresco 7 1 360 1 0 2 1 0 1 64
1 9
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 90
0
dres3 7 1 360 1 0 2 1 0 1 64
1 90
0
dseq2 2 2 8 0 0 2 1 0 1 64
1 "waltz16"
0
dseq 2 2 8 0 0 2 1 0 1 64
1 "waltz16"
0
flcoef 2 2 8 0 0 3 1 1 1 64
1 "1 0 0 0 0 0 1 0"
0
exppath 2 2 8 0 0 2 1 0 1 64
1 "/space/guest/vnmrsys/exp75/acqfil"
0
exp3D 2 2 8 0 0 2 1 0 1 64
1 "n"
0
f1180 2 2 8 0 0 2 1 0 1 64
1 "y"
0
fad2 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
fb 7 1 6 6 6 2 1 8203 0 64
1 5000
0
fsat 2 2 8 0 0 2 1 0 1 64
1 "n"
0
fn1 7 1 524288 64 -2 3 1 1 1 64
1 1024
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
file 2 2 6 0 0 2 1 3 1 64
1 "exp"
0
filter_flg 2 2 8 0 0 2 1 0 1 64
1 "y"
```

```

0
fmlev 4 2 4 0 0 2 1 0 1 64
1 "n"
0
flag3d 2 2 8 0 0 2 1 0 1 64
1 "y"
0
fn 7 1 524288 64 -2 3 1 1 1 64
1 8192
0
fpmult 1 1 1000000000 0 0 3 1 0 0 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 1
0
gfs1 1 1 1000 -1000 0.001 3 1 1 0 64
1 0
0
gfl 1 1 100000 0 0 3 1 1 0 64
1 0.0050210384652
0
gain 1 1 60 0 2 2 1 0 1 64
1 28
0
fscuba 4 2 4 0 0 2 1 0 1 64
1 "n"
0
gf 1 1 100000 0 0 3 1 1 1 64
1 0.0199128948152
0
gfs 1 1 1000 -1000 0.001 3 1 1 1 64
1 0.00288762967102
0
gt2 3 1 14 14 14 2 1 8192 1 64
1 0.0001
0
gt1 3 1 14 14 14 2 1 8192 1 64
1 0.001
0
gt0 3 1 32768 -32768 -1 2 1 8192 1 64
1 0.0001
0
gt4 3 1 14 14 14 2 1 8192 1 64
1 0.0003
0
gt3 3 1 14 14 14 2 1 8192 1 64
1 0.001
0
gt5 3 1 14 14 14 2 1 8192 1 64
1 0.0001
0
il 2 2 1 0 0 2 1 0 1 64
1 "n"
2 "y" "n"
ho 1 1 500 -500 0 4 1 1 1 64
1 -0
0
gzlv13 1 1 32768 -32768 1 2 1 0 1 64
1 -12000
0
gzlv11 1 1 32768 -32768 1 2 1 0 1 64
1 5000
0
gzlv10 1 1 32768 -32768 1 2 1 0 1 64
1 4000
0
gzlv12 1 1 32768 -32768 1 2 1 0 1 64
1 8000
0

```


gzlv15 1 1 32786 -32768 1 2 1 0 1 64
1 -8000
0
gzlv14 1 1 32786 -32768 1 2 1 0 1 64
1 15000
0
gzlv16 1 1 32786 -32768 1 2 1 0 1 64
1 14000
0
hs 4 2 4 0 0 2 1 0 1 64
1 "nnyn"
2 "n" "y"
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"
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
hzmm 1 1 1000000000 -1000000000 0 4 1 11 1 64
1 13.4134507201
0
io 1 1 500 -500 0.1 4 1 1 1 64
1 10
0
ins2ref 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 0 64
1 1
0
ins 3 1 8190 0 1e-07 4 1 3 1 64
1 100
0
in 4 2 1 0 0 2 1 0 1 64
1 "n"
3 "n" "w" "y"
ins2 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 100
0
intmod 2 2 8 0 0 4 1 0 1 64
1 "off"
3 "off" "partial" "full"
insref 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
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
is 1 1 1000000000 1e-06 0 4 1 3 1 64
1 4000
0
jxh2 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 94
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 30
0
r5 1 1 1e+18 -1e+18 0 4 1 1 1 64

```
1 0.032
0
osfilt 2 2 8 0 0 2 1 0 1 64
1 ""
5 "a" "A" "b" "B" ""
mixmlev 3 1 14 14 14 2 1 8192 1 64
1 0.02
0
lpext1 7 1 1000000 0 1 3 1 0 1 64
1 100
0
loc_ 7 1 12 12 12 2 1 8201 0 64
1 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
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
7 4184.7535823 3445.32962737 3445.32962737 2811.537666 2811.537666 2072.11371107 0
0
load 2 2 4 0 0 2 1 3 1 64
1 "n"
2 "y" "n"
lifrq 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 6049.6786901 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
lockpower_ 1 1 68 0 1 2 1 16 1 64
1 36
0
lockgain_ 1 1 48 0 1 2 1 16 1 64
1 37
0
lockfreq_ 5 1 160 0 1e-07 2 1 9 1 64
1 91.9267
0
lockphase_ 1 1 360 0 1 2 1 16 1 64
1 265
0
lp1 1 1 3600 -3600 0.1 4 1 3 1 64
1 -180
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
lsfid1 7 1 64000 -64000 1 3 1 0 0 64
1 0
0
lpopt1 2 2 8 0 0 3 1 0 1 64
1 "f"
0
lpnupts1 7 1 1000000 1 1 3 1 0 1 64
1 80
0
lpfilt1 7 1 32767 1 1 3 1 0 1 64
1 4
0
lptracel 7 1 32767 0 1 3 1 0 1 64
1 0
0
lpprint1 7 1 63 0 1 3 1 0 1 64
1 0
0
lsfid 7 1 64000 -64000 1 3 1 0 0 64
1 0
0
macro 2 2 6 0 0 4 1 3 1 64
1 ""
0
lsfrq1 1 1 9.99999984307e+17 -9.99999984307e+17 0 3 1 0 0 64
1 0
0

```

lsfrq 1 1 9.99999984307e+17 -9.99999984307e+17 0 3 1 0 0 64
1 0
0
lvl 1 1 10000000000 -10000000000 0 4 1 1 1 64
1 -0.66263745782
0
mcyc 7 1 32767 0 0 2 1 0 1 64
1 1
0
math 2 2 1 0 0 3 1 3 1 64
1 "f"
3 "d" "f" "i"
method 2 2 6 0 0 2 1 3 1 64
1 "/vnmr/shimmethods/zl2z2"
0
n3 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
mixshift 3 1 14 14 14 2 1 8192 1 64
1 0
0
mixnoe 3 1 14 14 14 2 1 8192 1 64
1 0.14
0
mlevpwr 7 1 32767 0 0 2 1 0 1 64
1 50
0
n2 2 2 6 0 0 4 1 3 1 64
1 ""
0
np 7 1 524288 32 2 2 1 11 1 64
1 1152
0
ni 7 1 32767 0 0 2 1 0 1 64
1 32
0
ncyc_cp 1 1 80 0 0 2 1 0 1 64
14 0 20 1 16 2 14 3 12 4 10 6 8 14 4
0
notebook 2 2 8 0 0 2 1 0 1 64
1 ""
0
oscoef 7 1 49999 3 2 2 1 1 1 64
1 165
0
nt 7 1 10000000000 1 1 2 1 2 1 64
1 64
0
osfb 1 1 100000 0 0 2 1 1 0 64
1 0
0
pw 6 1 13 13 13 2 1 8194 1 64
1 7.275
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
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 22
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
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
pkpick_ 2 2 8 0 0 4 1 0 1 64
1 ""
0
phfid 1 1 3600 -3600 0.1 3 1 0 0 64
1 0
0
phase 7 1 4 0 1 2 1 0 1 64
2 1 2
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
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
procl 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
processid 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 0
0
procdim 7 1 1000000000 -1000000000 0 3 1 0 1 64
1 1
0
pslabel 2 2 8 0 0 2 1 11 1 64
1 "Ha_SO_exchange_DFH_600_GLY"
0
pwd1 6 1 13 13 13 2 1 8192 1 64
1 146
0
pwc0180 6 1 13 13 13 2 1 8192 1 64
1 254
0
pwc_reb 6 1 13 13 13 2 1 8192 1 64
1 3004
0
pw_cp 6 1 13 13 13 2 1 8192 1 64
1 9.9375
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 13.475
0
pwca 6 1 13 13 13 2 1 8192 1 64
1 50
```

```
0
pwcod 6 1 13 13 13 2 1 8192 1 64
1 234
0
pwco_sh 2 2 8 0 0 2 1 0 1 64
1 "herm180_17p6_750"
0
pwd 6 1 13 13 13 2 1 8192 1 64
1 380
0
pxcodec 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 43
0
pwx1 6 1 13 13 13 2 1 8192 1 64
1 36
0
pwx2 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 0.0265631999999
0
r1 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 0.0013333
0
r3 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 99.3962666667
0
r4 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 0.0182848
0
vsproj 1 1 1000000000 1e-06 0 4 1 3 1 64
1 8919.9846871
0
time_T2 3 1 14 14 14 2 1 8192 1 64
1 0.016
0
sbs 1 1 1000 -1000 0.001 3 1 1 0 64
1 -0.0195756480098
0
rfpl 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 6776.352486
0
reffrq1 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 150.5856108
0
ref 5 1 1000000000 -1000000000 0 3 1 0 1 64
1 0
0
r6 1 1 1e+18 -1e+18 0 4 1 1 1 64
1 0
0
r7 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
1 598.843057922
0
rfband 4 2 4 0 0 2 1 0 1 64
1 "cccc"
3 "c" "h" "l"
refpos1 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0
0
refpos 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0
0
```

```

refsource1 2 2 8 0 0 4 1 0 1 64
1 "sfrq"
0
rfl1 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 1129.36924728
0
rfl 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 1642.67204476
0
rfp 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 0
0
sample 2 2 8 0 0 2 1 0 1 64
1 "lysh2o"
0
rp 1 1 3600 -3600 0.1 4 1 3 1 64
1 -175.790697674
0
rof2 6 1 13 13 13 2 1 8194 1 64
1 2
0
rof1 6 1 13 13 13 2 1 8194 1 64
1 0
0
rpl 1 1 3600 -3600 0.1 4 1 3 1 64
1 90
0
satpwr 1 1 9.99999984307e+17 -9.99999984307e+17 0 2 1 0 1 64
1 12
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
satfrq 5 1 1000000000 -1000000000 0 2 1 0 1 64
1 -9970
0
sb 1 1 1000 -1000 0.001 3 1 0 0 64
1 0.0167341995984
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
sbl 1 1 1000 -1000 0.001 3 1 1 1 64
1 -0.148
0
spin 1 1 32000000 0 0.1 2 1 0 0 64
1 0
0
sfrq 1 1 1000000000 0 0 2 1 11 1 64
1 598.8459157
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
sbs1 1 1 1000 -1000 0.001 3 1 1 1 64
1 -0.148
0
sc2 1 1 3 3 3 4 1 8195 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 "Ha_SO_exchange_DFH_600_GLY"
0
sfl 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0
0
sn 1 1 1e+18 -1e+18 0 3 1 1 1 64
1 0
0
shape 2 2 8 0 0 2 1 0 1 64
1 "herml80_trc"
0
sh_reb 2 2 8 0 0 2 1 0 1 64
1 "reb_gly_on"
0
shims 2 2 8 0 0 2 1 0 1 64
1 ""
0
sp 1 1 10000000000 -10000000000 0 4 1 3 1 64
1 -1640.47455938
0
solvent 2 2 6 0 0 2 1 11 1 64
1 "d2o"
0
spl 1 1 10000000000 -10000000000 0 4 1 3 1 64
1 5646.98323872
0
strtlp1 7 1 1000000 1 1 3 1 0 1 64
1 100
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
1 128
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
strtext1 7 1 1000000 1 1 3 1 0 1 64
1 101
0
taua 3 1 14 14 14 2 1 8192 1 64
1 0.0017857125
0
swl 1 1 5000000 1 -2.5e-08 2 1 0 1 64
1 1204.67413565
0
sw 1 1 5 5 5 2 1 8203 1 64
1 9000.90009001
0
tau_eq 3 1 14 14 14 2 1 8192 1 64
1 0.003
0

```



```
th 1 1 1000000000 0 0 4 1 1 1 64
1 1
0
temp 1 1 200 -150 0.1 2 1 8 1 64
1 25
0
th2d 1 1 1 1e-18 0 4 1 17 1 64
1 0.8
0
tpwr_cp 1 1 17 17 17 2 1 8192 1 64
1 60
0
time_submitted_local 2 2 8 0 0 2 1 0 1 64
1 "20080808T194637X07PMFriAug"
0
time_run 2 2 8 0 0 2 1 0 1 64
1 "20080808T194642"
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 "20080810T132746"
0
time_processed 2 2 8 0 0 3 1 0 1 64
1 "20080808T195657"
0
time_submitted 2 2 8 0 0 2 1 0 1 64
1 "20080808T194637"
0
time_saved 2 2 8 0 0 2 1 0 1 64
1 ""
0
tn 2 2 4 0 0 2 1 8 1 64
1 "H1"
0
tin 2 2 1 0 0 2 1 2 1 64
1 "y"
3 "n" "w" "y"
time_svfddate 2 2 8 0 0 2 1 0 1 64
1 "20080808T194637"
0
tlt 1 1 1000000000 -1000000000 0 4 1 1 1 64
1 0.181152590812
0
tof 5 1 7 7 7 2 1 8202 1 64
1 -1556
0
tnsat 4 2 4 0 0 2 1 0 1 64
1 "y"
0
tpwr 7 1 17 17 17 2 1 8194 1 64
1 63
0
vo 1 1 500 -500 0 4 1 1 1 64
1 0
0
tsatpwr 1 1 17 17 17 2 1 8192 1 64
1 -16
0
trace 2 2 2 0 0 4 1 3 1 64
1 "f2"
2 "f1" "f2"
tpwrf 7 1 4095 0 1 2 1 2 0 64
1 4095
0
trim 3 1 14 14 14 2 1 8192 1 64
1 0.0005
0
vf 1 1 1000000000 0 0 4 1 3 1 64
1 103279116524
0
username 2 2 8 0 0 2 1 0 1 64
```

```
1 "guest"
0
vloc_ 2 2 8 0 0 2 1 8 1 64
1 "C7"
0
vproto_ 2 2 8 0 0 2 1 0 1 64
1 ""
0
vpf 1 1 500 -500 0 4 1 0 1 64
1 16.1448614824
0
vp 7 1 500 -500 0.1 4 1 3 1 64
1 9.13755445197
0
vpfi 1 1 500 -500 0 4 1 0 1 64
1 0
0
vs 1 1 1000000000 1e-06 0 4 1 3 1 64
1 188513.431444
0
vrack_ 7 1 5 1 0 2 1 0 1 64
1 1
0
vs2d 1 1 1000000000 1e-06 0 4 1 3 1 64
1 3701.72832204
0
yz2 7 1 19 19 19 2 1 8192 1 64
1 10906
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"
wdone 2 2 8 0 0 3 1 0 1 64
1 "acqdone"
0
wbs 2 2 6 0 0 3 1 3 1 64
1 ""
0
vtwait 3 1 14 14 14 2 1 8194 1 64
1 180
0
vtc 1 1 255 0 1 2 1 2 1 64
1 0
0
vzone_ 7 1 15 1 0 2 1 0 1 64
1 1
0
wc2 1 1 4 4 4 4 1 8195 1 64
1 130
0
wc 1 1 2 2 2 4 1 8203 1 64
1 250
0
wfl 1 1 9.99999984307e+17 -9.99999984307e+17 0 4 1 0 1 64
1 0.425011199999
0
wexp 2 2 6 0 0 3 1 3 1 64
1 "rm_relax"
0
werr 2 2 6 0 0 3 1 3 1 64
1 ""
0
wf 1 1 8190 0 1e-07 4 1 3 1 64
1 0.0639936
0
wp 1 1 5000000 0 0 4 1 11 1 64
1 8998.70260464
0
wnt 2 2 6 0 0 3 1 3 1 64
1 ""
0
wpl 1 1 100000 0 0 4 1 3 1 64
1 1204.67413565
```

```
0
xy 7 1 19 19 19 2 1 8192 1 64
1 2155
0
x2y2 7 1 19 19 19 2 1 8192 1 64
1 -3268
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
x1 7 1 19 19 19 2 1 8192 1 64
1 -1206
0
x4 7 1 19 19 19 2 1 8192 1 64
1 0
0
x3 7 1 19 19 19 2 1 8192 1 64
1 5285
0
xdiag 1 1 1e+18 0 0 4 1 17 1 64
1 0
0
y1 7 1 19 19 19 2 1 8192 1 64
1 1477
0
xz2 7 1 19 19 19 2 1 8192 1 64
1 1657
0
xz 7 1 19 19 19 2 1 8192 1 64
1 -1524
0
y4 7 1 19 19 19 2 1 8192 1 64
1 0
0
y3 7 1 19 19 19 2 1 8192 1 64
1 3857
0
yz 7 1 19 19 19 2 1 8192 1 64
1 -3267
0
z3y 7 1 19 19 19 2 1 8192 1 64
1 -8662
0
z2xy 7 1 19 19 19 2 1 8192 1 64
1 -4474
0
z2 7 1 19 19 19 2 1 8192 1 64
1 -4233
0
z1 7 1 19 19 19 2 1 8192 1 64
1 13864
0
z0_ 1 1 19 19 19 2 1 8208 1 64
1 -11195
0
z1c 7 1 19 19 19 2 1 8192 1 64
1 0
0
z2x2y2 7 1 19 19 19 2 1 8192 1 64
1 -8497
0
z2c 7 1 19 19 19 2 1 8192 1 64
1 0
0
z2x3 7 1 19 19 19 2 1 8192 1 64
1 4562
0
z3x 7 1 19 19 19 2 1 8192 1 64
1 4903
0
```

z3 7 1 19 19 19 2 1 8192 1 64
1 -971
0
z2y3 7 1 19 19 19 2 1 8192 1 64
1 1518
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 -440
0
z3x2y2 7 1 19 19 19 2 1 8192 1 64
1 -1232
0
z3xy 7 1 19 19 19 2 1 8192 1 64
1 -2734
0
z5 7 1 19 19 19 2 1 8192 1 64
1 8877
0
z4x 7 1 19 19 19 2 1 8192 1 64
1 1243
0
z4 7 1 19 19 19 2 1 8192 1 64
1 3110
0
z3y3 7 1 19 19 19 2 1 8192 1 64
1 -2324
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 1609
0
z4x2y2 7 1 19 19 19 2 1 8192 1 64
1 -2702
0
z4y 7 1 19 19 19 2 1 8192 1 64
1 42
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 5691
0
z5x 7 1 19 19 19 2 1 8192 1 64
1 -2185
0
z6 7 1 19 19 19 2 1 8192 1 64
1 -15605
0
zx2y2 7 1 19 19 19 2 1 8192 1 64
1 162
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 12677
0
zx3 7 1 19 19 19 2 1 8192 1 64
1 571
0
zy3 7 1 19 19 19 2 1 8192 1 64
1 2167
0