

### Beamtime preparation

Name: Beamtime preparation

Authors: No Authors selected

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Proposal number: 20101867-ST

Start date: 2020-02-03 09:37:35 +0100

List of used frequencies [THz]: 0.0; 700.0

Frequency 1: 0.7

Frequency 2: 0.5

Default object type: EXPERIMENTAL\_STEP\_TELBE\_LOG

Detailed description: Start with cooling down the magnet.

As preparative step the cards for LHe and LN2 level meters in the magnet controller have been exchanged by Alexey and Nilesch.

Monday Feb 3rd:

11:00 Pressure in magnet:  $1.5 \times 10^{-6}$  mbar → seems good.

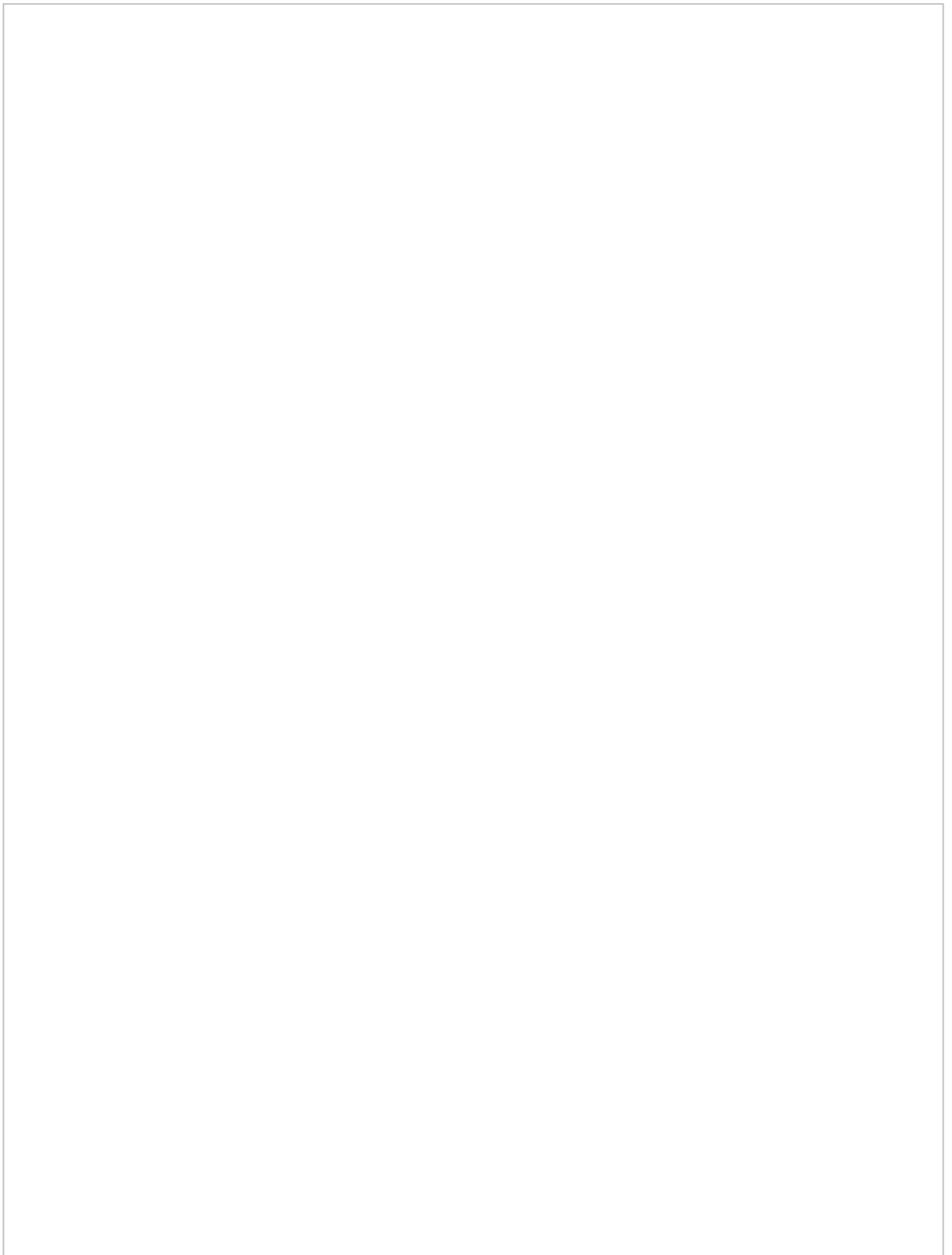
- start cooling the magnet soon

Inner and outer part are filled with LN2 expect some evaporation during the night.

February 4<sup>th</sup>

LN2 level in outer part at 72% in the morning

Started blowing out the LN2 from the inner part. Setup see picture:



waited for 1h and then filled LHe

→ procedure was rather quick. Used ca.  $\frac{1}{2}$  dewar of LHe for this.

**February 6<sup>th</sup> (Thursday)**

9:00

Magnet filling levels: LHe 67%

LN2: 77%

We have the beam. Do a quick power check (correct wavelength ranges have been chosen for powermeter)  
Power meter in cave: 480 mW  
Power BDA (no filter): 375 mW

one Bandpass filter 0.7 THz: 160 mW

two BW filter 0.7 THz: 98 mW

one BP filter 0.75 THz: 175 mW

two BP filters 0.75 THz: 117 mW

11:30

found the spectral decoding signal (only fundamental locking so far). The delay on the oscilloscope between RegA and BPM is 86.116 ns

We have a problem with the spectral decoding camera, as it does not display a stable background image (laser only) but this jumps. We suspect a trigger/exposure error, but changing settings does not help so far.

14:00

refilled LN2 in magnet

14:50

Ulfe made 0.5 THz tune. Power BDA through 1 BP (20%) is 104 mW

15:39

Ulfe made 0.5 THz tune. Power BDA through 1 BP (20%) is 40 mW

Ulfe start to tune 0,7 THz. Put one 0,7THz BP filter into BDA.

19:25

3#+

#Got beam of 0.7 THz with power of 196 mW after filter

21:30 – returned to default setting of RegA,

optimized the postpulse – lower than 10 mV, main peak is higher than 250 mV.

RegA is 100 kHz, power is 750 mW

Checked the SDEOS – adjusted the signal on the camera – maximum BG – looks stable now.

Added ND20 filter on the chirped pulse path and opened aperture in the CDR path – looks very clean.

Aligned the pyro detector – looks good

power at sample position (0.6-1THz calibration): 116 mW, 2x700GHz filters are used,

at BDA – 120 mW (do not know what is the calibration)

Spot size at sample position is 2.1mm – fixed position with green laser.

THz spot size at EOS – 1.2 mm, power is 50mW,  
overlapped with laser pulse

found time zero at 92mm position

Started EOS with 2mm ZnTe, gain 1, used WG at 130 degs (with zero at 50) not to saturate EOS: File: 001\_EOS...

put 2100 GHz BP filter, full power, changed Det100 detectors, now subtraction is much better – used gain 100  
File: 002\_EOS

put the sample in, used green LED to see that it is on the center of sample,

File: 003\_EOS, room temperature, BDA power 140 mW, 2x700GHz and 1x 2100 GHz, gain 100, full power

Had a lot of issues with magnet, replaced the motor valve with manual one,

set 10K temperature, file: 004\_EOS, BDA power is 130 mW

The issue with magnet was that we put flow and heater in manual and could not control flow – afterwards it is fixed – but now we have manual flow control

set 35K temperature, file: 005\_EOS, BDA power is 130 mW

set 5K temperature, file: 006\_EOS, BDA power is 130 mW

set 40K temperature, file: 007\_EOS, BDA power is 130 mW

Log entry  
overview  
(automatically  
generated):

Log for Filename **001\_test\_autosort**

- Start date: 2020-02-06 15:03:06 +0100
- End date: 2020-02-06 15:03:13 +0100
- Power BDA [mW]: 0.0
- Sample temperature [K]: 0.0
- THz frequency [THz]: 0.0
- THz polarizer angle [deg]: 0.0
- AI1 0 max: 0.2
- AI1 0 min: -0.2
- AI2 3 switch: true
- Stage 1 start position [mm]: 65.0
- Stage 1 number of steps: 1
- Stage 1 step size [mm]: -0.1
- Number of loops (TELBE): 1

Log for Filename **003\_EOS\_700GHz\_2100GHz\_sample1\_RT**

- Start date: 2020-02-07 01:45:33 +0100
- End date: 2020-02-07 01:59:24 +0100
- Power BDA [mW]: 130.0
- Sample temperature [K]: 0.0
- THz frequency [THz]: 700.0
- THz filter used?: true
- THz polarizer angle [deg]: 130.0
- AI1 0 max: 1.0
- AI1 0 min: -1.0
- AI2 3 switch: true

- Stage 1 start position [mm]: 93.0
- Stage 1 number of steps: 100
- Stage 1 step size [mm]: -0.1
- Number of loops (TELBE): 2
- Notes: EOS with 2mm ZnTe no sample, no magnet gain 100 - replaced Det100 detectors to reach higher compensation full power used 2x700 GHz filters used 1x2100 GHz filter BDA power is 130 mW put the sample1 in

Log for Filename **004\_EOS\_700GHz\_2100GHz\_sample1\_10K**

- Start date: 2020-02-07 04:29:43 +0100
- End date: 2020-02-07 04:43:19 +0100
- Power BDA [mW]: 130.0
- Sample temperature [K]: 10.0
- THz frequency [THz]: 700.0
- THz filter used?: true
- THz polarizer angle [deg]: 130.0
- AI1 0 max: 1.0
- AI1 0 min: -1.0
- AI2 3 switch: true
- Stage 1 start position [mm]: 93.0
- Stage 1 number of steps: 100
- Stage 1 step size [mm]: -0.1
- Number of loops (TELBE): 2
- Notes: EOS with 2mm ZnTe no sample, no magnet gain 100 - replaced Det100 detectors to reach higher compensation full power used 2x700 GHz filters used 1x2100 GHz filter BDA power is 130 mW put the sample1 in

Log for Filename **005\_EOS\_700GHz\_2100GHz\_sample1\_35K**

- Start date: 2020-02-07 04:48:18 +0100
- End date: 2020-02-07 04:57:49 +0100
- Power BDA [mW]: 130.0
- Sample temperature [K]: 35.0
- THz frequency [THz]: 700.0
- THz filter used?: true
- THz polarizer angle [deg]: 130.0
- AI1 0 max: 1.0
- AI1 0 min: -1.0
- AI2 3 switch: true
- Stage 1 start position [mm]: 91.5
- Stage 1 number of steps: 70
- Stage 1 step size [mm]: -0.1
- Number of loops (TELBE): 2
- Notes: EOS with 2mm ZnTe no sample, no magnet gain 100 - replaced Det100 detectors to reach higher compensation full power used 2x700 GHz filters used 1x2100 GHz filter BDA power is 130 mW put the sample1 in Temperature 35K

Log for Filename **006\_EOS\_700GHz\_2100GHz\_sample1\_5K**

- Start date: 2020-02-07 05:02:50 +0100
- End date: 2020-02-07 05:12:20 +0100
- Power BDA [mW]: 130.0
- Sample temperature [K]: 35.0
- THz frequency [THz]: 700.0
- THz filter used?: true
- THz polarizer angle [deg]: 130.0
- AI1 0 max: 1.0
- AI1 0 min: -1.0
- AI2 3 switch: true
- Stage 1 start position [mm]: 91.5
- Stage 1 number of steps: 70
- Stage 1 step size [mm]: -0.1
- Number of loops (TELBE): 2
- Notes: EOS with 2mm ZnTe LSCO(x=0.30) no magnet gain 100 - replaced Det100 detectors to reach higher compensation full power used 2x700 GHz filters used 1x2100 GHz filter BDA power is 130 mW put the sample1 in Temperature 5K

Log for Filename **007\_EOS\_700GHz\_2100GHz\_sample1\_40K**

- Start date: 2020-02-07 05:18:49 +0100

- End date: 2020-02-07 05:28:18 +0100
- Power BDA [mW]: 130.0
- Sample temperature [K]: 35.0
- THz frequency [THz]: 700.0
- THz filter used?: true
- THz polarizer angle [deg]: 130.0
- AI1 0 max: 1.0
- AI1 0 min: -1.0
- AI2 3 switch: true
- Stage 1 start position [mm]: 91.5
- Stage 1 number of steps: 70
- Stage 1 step size [mm]: -0.1
- Number of loops (TELBE): 2
- Notes: EOS with 2mm ZnTe LSCO(x=0.30) no magnet gain 100 - replaced Det100 detectors to reach higher compensation full power used 2x700 GHz filters used 1x2100 GHz filter BDA power is 130 mW put the sample1 in Temperature 40K

Children: EXPERIMENTAL\_STEP\_TELBE\_LOG: EXP\_TELBE\_LOG-  
 1151(003\_EOS\_\_700GHz\_2100GHz\_sample1\_RT), EXP\_TELBE\_LOG-  
 1152(004\_EOS\_\_700GHz\_2100GHz\_sample1\_10K), EXP\_TELBE\_LOG-  
 1153(005\_EOS\_\_700GHz\_2100GHz\_sample1\_35K), EXP\_TELBE\_LOG-  
 1154(006\_EOS\_\_700GHz\_2100GHz\_sample1\_5K), EXP\_TELBE\_LOG-  
 1155(007\_EOS\_\_700GHz\_2100GHz\_sample1\_40K)  
 FWKP\_LASER\_PARAMETERS: FWKP\_LASER-14(Beamtime Feb 6th Preperation)

Modification Date: Fri Feb 07 2020 09:32:11 GMT+0100 (Central European Standard Time)

Registration Date: Wed Jan 29 2020 09:39:21 GMT+0100 (Central European Standard Time)