

## TELBE beamtime: 14.06.2018 day shift

**Notebook:** Old TELBE Notebook (1)

**Created:** 14.06.2018 06:50

**Updated:** 14.06.2018 21:25

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MG, SG, BG:

### ***summary of the night shift:***

***- polarization dependence on LSCO is finished***

***- decision to stop TPOP on LSCO***

***- decision to move to BSCO***

6:53 accelerator is still down

- warming up cryostat to change samples

9:00

BG:

Spoke with the accelerator guys, the problem is that something is wrong within the control network, and occasionally the ELBE network. It may be a feedback loop from an improperly connected ethernet cable or misconfigured device, or it could also be a worm or some other invasive program (less likely). They are waiting on someone from the IT department to hopefully help them diagnose and fix it.

9:07

Start pumping down cryostat with new sample.

**SAMPLE TEMPERATURE SENSOR DON'T WORK PROPERLY**

**AFTER SPEAKING WITH ZHE DECIDE TO VENT CRYOSTAT AGAIN AND LOOK AT WIRES**

We're found that one wire was disconnected. Should be fixed.

9:36

Temperature sensor fixed. One wire was cut off. Now sensor show temperature.

Remount sample.

9:55

Start pump down cryostat

**10:00**

**accelerator is only half up, there still is some systems not responding to the control system**

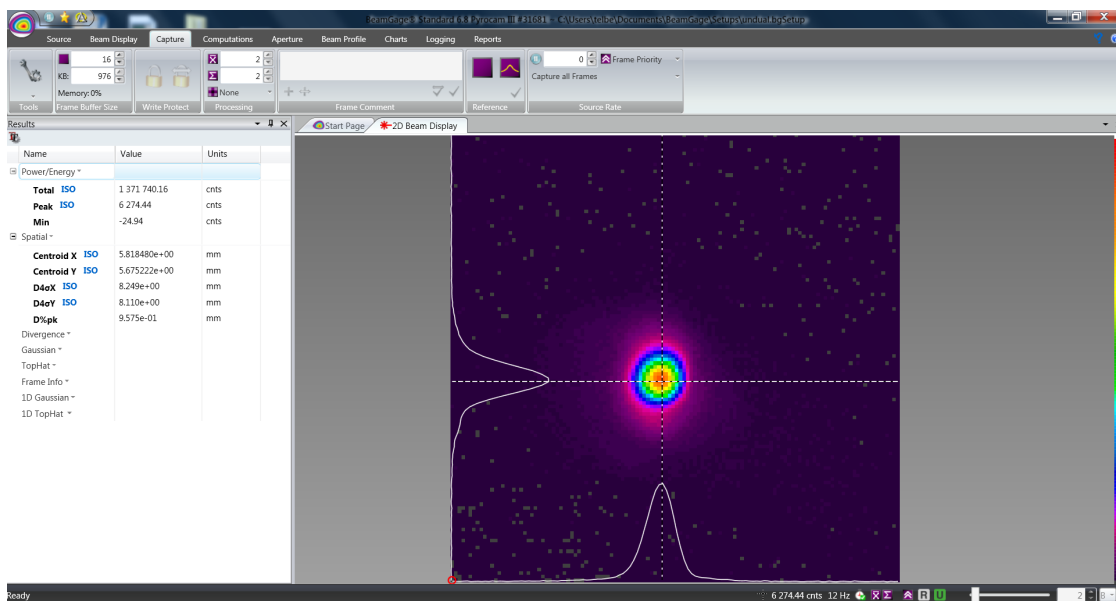
**14:30 beam back!**

**power BDA: 107.4 mW fb, 42.8 mW**

now start to realign the set-up

**14:40**

**check THz beamprofile at sample position: 950 micron**



14:50  
checked overlapping at ZnTe position

15:01  
measure power at sample position: 103 mW, 44(1 filter), 30mW (with 2 filters)  
power after BDA: 112 mW

put polarizer theta 1 in, maximum at theta1=157 degrees, 29.8 mW  
with theta 2, maximum at theta2=49 degrees, 29.5 mW

15:18  
power after BDA: 110.5 without, and 43mW with 1 filter  
put two filters in.  
setttings for fluence dependence measurements  
theta2=49°  
theta1=157°, 29.5mW  
theta1=172°, 25.9mW  
theta1=187°, 17.7mW  
195°, 13.2mW  
202°, 9.2mW  
209°, 6.0mW  
213°, 4.3mW  
217°, 2.85mW  
222°, 1.64mW  
232°, 0.23mW  
247°, -0.03mW  
262°, 0.16mW

15:45  
moved cryostat to sample position  
checked focus at the sample position

16:30  
started cooling the sample

check EOS detection setup: 800 nm laser is going through ZnTe rather centrally (note, there are some burn marks(?) close to the center of the ZnTe). Signal of 1 diode (no gain) is roughly 200 mV. Balance diodes at gain 20

16:57  
sample is 20K

start to do fluence dependence

16:58

power BDA: 110mW

file:091\_0p7THz\_BSCO\_19p4K\_THG\_P1\_157\_P2\_49

measured 2 loops and aborted in third one

power after: 112 mW

polarizer 1 at 172 deg

file:092\_0p7THz\_BSCO\_18p7K\_THG\_P1\_172\_P2\_49

17:49

power BDA= 113mW

theta1=187 deg

file:093\_0p7THz\_BSCO\_19p7K\_THG\_P1\_187\_P2\_49

17:56

power BDA= 113mW

theta1=195 deg

file:094\_0p7THz\_BSCO\_19p5K\_THG\_P1\_195\_P2\_49

18:02

power BDA= 112mW

theta1=202 deg

file:095\_0p7THz\_BSCO\_19p5K\_THG\_P1\_202\_P2\_49

18:10

power BDA= 111mW

theta1=209 deg

file:096\_0p7THz\_BSCO\_19p5K\_THG\_P1\_209\_P2\_49

18:17

power BDA= 111mW

theta1=213 deg

file:097\_0p7THz\_BSCO\_19p5K\_THG\_P1\_213\_P2\_49

18:25

power BDA= 112mW

theta1=217 deg

file:098\_0p7THz\_BSCO\_19p5K\_THG\_P1\_217\_P2\_49

18:31

power BDA= 112mW

theta1=232 deg

file:099\_0p7THz\_BSCO\_19p5K\_THG\_P1\_232\_P2\_49

repeat same measurement while we wait for sorted data

18:36

power BDA= 112mW

theta1=232 deg

file:100\_0p7THz\_BSCO\_19p5K\_THG\_P1\_232\_P2\_49

Do measurement with cryostat/sample removed from path to check for leakage:

power BDA = 110 mW

theta1=157 deg

file:101\_0p7THz\_BSCO\_19p5K\_THG\_P1\_157\_P2\_49

it turns out that for full power pump, the leakage is about  $10^{-4}$  of the transmitted fundamental in power

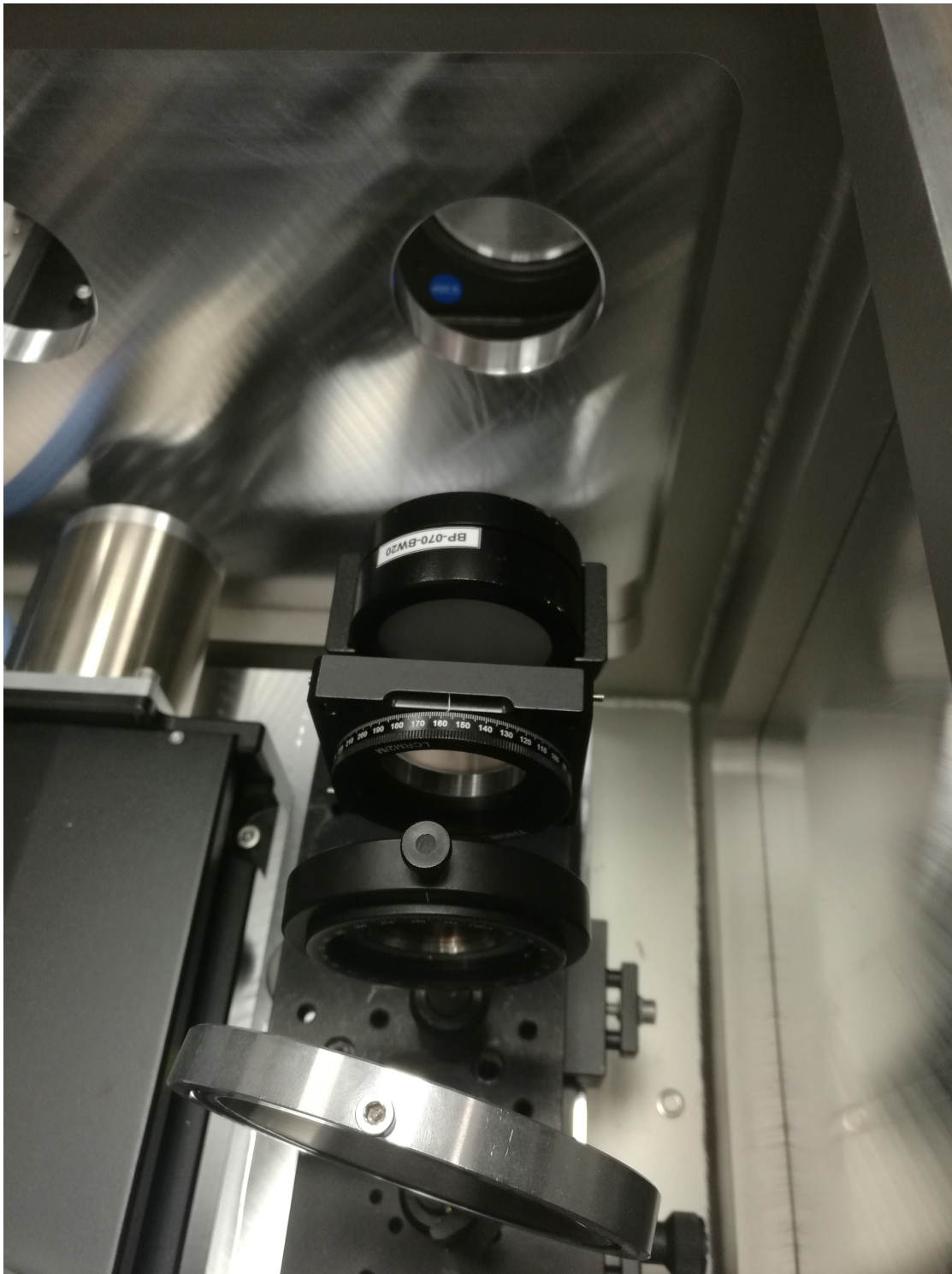
since the THG signal drops in cubic with decreasing fundamental power, it will go under the leakage for low pump power!

**we decided to add the 670GHz filter to reduce the pump power as well as the leakage!**

**To reduce pump power, so that we are in the cubic dependent regime**

20:02

power at sample position: 10.2 mW



repeat leakage measurement with 1 more filter in fundamental:

now we have one 670GHz, two 700THz filters in front of sample

20:10

power BDA = 109 mW

theta1=157 deg

file:102\_0p7THz\_BSCO\_19p5K\_THG\_P1\_157\_P2\_49



20:54

power BDA = 102 mW

theta1=157 deg

theta2=49 deg

file:103\_0p7THz\_BSCO\_19p7K\_THG\_P1\_157\_P2\_49

21:17

start temperature dependence measurements

set temperature to 25K

power BDA = 108 mW

file:104\_0p7THz\_BSCO\_24p5K\_THG\_P1\_157\_P2\_49

21:27

set temperature to 30K

power BDA = 107 mW

file:105\_0p7THz\_BSCO\_29p9K\_THG\_P1\_157\_P2\_49