

## 13th Secondary Beam Line Meeting October 03, 2016

**Present:** Edda Gschwendtner, Marlene Turner, Christoph Hessler, Karl Rieger, Aurelie Goldblatt, Ans Pardons, Alexey Petrenko, Patric Muggli, Spencer Gessner, Joshua Moody, Mikhail Martyanov, Sebastien Bustamante, Janet Schmidt, Veronica Olsen

All presentations can be found on Indico at: <https://indico.cern.ch/event/573615/>

The next SBLM date is:

- **17<sup>th</sup> October** 2016 15:00 in B530-R-30

### Agenda

1. Laser Commissioning Results
2. OTR Commissioning Results
3. BI-streak Commissioning Results
4. Commissioning Results of the SMI-BTVs
5. CTR Commissioning Results

### 1) Laser Commissioning Results (Josh)

[https://indico.cern.ch/event/573615/contributions/2321185/attachments/1346975/2031456/SBLM3\\_10\\_2016.pdf](https://indico.cern.ch/event/573615/contributions/2321185/attachments/1346975/2031456/SBLM3_10_2016.pdf)

The goal of the Laser commissioning was to achieve:

- 1) spatial overlap of the proton and laser beam on screens up-and downstream the vapour source,
- 2) temporal overlap of the laser pulse with the proton beam.

The spatial overlap was achieved on the BTVs upstream and downstream the plasma cell by using MP4 and MP5 rotation. The laser got positioned on the proton beam reference to within 300 microns.

Josh saw a laser jitter in the order of 200-300 microns, which corresponds to 6 urad pointing jitter. → **Action: Josh works on improving the jitter.** The operational point of the positioning of the mirror on the translator was set to be 11 mm.

Concerning the Temporal overlap, the fine synchronization is down to the 20 ps scale.

The CMOS cameras of the virtual laser line are suffering from secondary radiation produced by the proton beam, and will be replaced by CCD cameras.

## 2) OTR Commissioning Results

[https://indico.cern.ch/event/573615/contributions/2321195/attachments/1347042/2031581/SBLM\\_rieger\\_3\\_10\\_16.pdf](https://indico.cern.ch/event/573615/contributions/2321195/attachments/1347042/2031581/SBLM_rieger_3_10_16.pdf)

The OTR and Laser pulse were found on the MPP streak camera, time and space resolved measurements of the beams are possible. The laser and proton beam can now be overlapped in a 1 ns time-window with a precision smaller than 20 ps. The exact calibration of the transfer lines is coming in the next weeks. Photodiodes and the BI software are also operational. The MPP streak camera was operated with an expert application and only minor problems were found. The expert application was not yet tested together with the fixed display. Oasis logged data at 1/40 Hz and the data is stored in timber.

## 3) BI-Streak Commissioning Results

[https://indico.cern.ch/event/573615/contributions/2321196/attachments/1347044/2031585/AWAKE\\_SBLM\\_Meeting\\_03-10-2016.pdf](https://indico.cern.ch/event/573615/contributions/2321196/attachments/1347044/2031585/AWAKE_SBLM_Meeting_03-10-2016.pdf)

The laser and the proton bunch were found in all time-windows (1ns to 50ps) of the BI-streak camera. The expert application was working as expected and can acquire, save and load images. Further work includes: to develop a peak detection algorithm for the acquired images, to perform tests on the optical line and understand why the focusing is worse than expected, to close the slit of the streak camera to increase resolution and add motorization for remote control, and to replace the streak PC with a new Kontron PC.

## 4) Commissioning Results of the SMI BTVs

<https://indico.cern.ch/event/573615/contributions/2321201/attachments/1347003/2031511/SBLM.pdf>

Marlene showed the beam images of the two BTV stations downstream of the plasma cell (BTV 412426,412442). Both BTV stations have at least one screen for which it is important that the beam is right at the centre of the BTV screen. With the current proton beam trajectory, the screen center and proton beam position are misaligned ( $\Delta x$ = misalignment in the horizontal plane,  $\Delta y$  = misalignment in the vertical plane):

- 1) for BTV412426:  $\Delta x = 1.82$  mm,  $\Delta y = 0.5$  mm.
- 2) for BTV412442:  $\Delta x = 1.17$  mm,  $\Delta y = 0.46$  mm.

The plan is as follows: Since the proton beam trajectory might change after the installation of the plasma cell ends, the two BTV stations will be tested again during the next phase of beam commissioning. If the screens are still misaligned, they will be dismantled and realigned in the BI laboratory or the errors will be corrected by a shift of the BTV tank.

During the proton beam commissioning, the influence of the first beam screen onto the second one was studied, analysis is ongoing. Images of the BTV screens are not very well focused → **Action BI: Refocus before the next proton beam.**

## 5) CTR Commissioning Results

[https://indico.cern.ch/event/573615/contributions/2324563/attachments/1347295/2032071/CTR\\_summary\\_CERN\\_03-10-2016.pdf](https://indico.cern.ch/event/573615/contributions/2324563/attachments/1347295/2032071/CTR_summary_CERN_03-10-2016.pdf)

Misha showed pictures of the CTR installation. Under the conditions of the proton beam commissioning, he expected to see no signal. All Diodes and detectors worked from the operational point of view. He observed some signals on the ACST 1 free space Schottky diode, the pyro detector and some diodes, and it is not yet very clear on where these signals come from. He suspects that the signals could originate from a proton bunch modulation from 110-140 GHz. Furthermore all devices got affected by the radiation produced by LBDP2, it is to be understood on how this affects the measurement. In order to get better signals from OASIS- and to avoid attenuation of signals- Misha wants to move OASIS to the RA01-MUNICH rack in the streak room.

### Next meeting

The next Secondary Beam Line Meeting will take place on the **17<sup>th</sup> October 2016 at 15:00** in B530-R-30. A detailed agenda will be sent out in due time.

Marlene and Edda 06/10/2016