

## 9th Secondary Beam Line Meeting May 17, 2016

**Present:** Marlene Turner, Alexander Gorn, Alexey Petrenko, Stefano Mazzoni, Lars Jensen, Edda Gschwendtner, Joshua Moody, Jozef Batkiewicz, Bartolomej Biskup, Falk Braunmüller, Sebastien Bustamante, Janet Schmidt, Roman Gorbonosov, Krzysztof Szczurek, David Medina, Valentine Fedosseev, Marine Gourber-Pace, Mikhail Martyanov, Karl Rieger, Florence Friebe

All presentations can be found on Indico at: <https://indico.cern.ch/event/563782/>

The next SBLM date is:

- **12<sup>th</sup> of September** 2016 15:30 in B530-R-28

### Agenda

1. Summary of beam dynamics studies (Alexander)
2. Dry run (Edda, Marine)
3. Update on BI (Stefano)
4. Commissioning of OTR and CTR diagnostics (Misha)
5. A.O.B.

### 1) Summary of beam dynamics studies for AWAKE

<https://indico.cern.ch/event/563782/contributions/2278294/attachments/1327913/1994204/Report.pdf>

Alexander spent two months as a Summer Student here at CERN and summarized in this presentation his work:

Earth magnetic field studies: as a consequence of the earth magnetic field measurements done in the AWAKE area (see <https://indico.cern.ch/event/557345/>, AWAKE Technical board 8/8/2016) he studied the influence of the earth magnetic field onto the un-accelerated electron beam, beam loading and ionization injection. Concerning the earth magnetic field he concludes that the un-accelerated electron beam can only exit the plasma if either the earth magnetic field is corrected or the electron beam is launched in an angle.

Beam loading: Alexander studied the beam loading, especially with a triangular witness beam and he explained that the more charge we want to accelerate, the higher the wakefield amplitude has to be - and the scaling is linear. In the most optimistic case for AWAKE run II –when reaching 0.5 GV/m- we can accelerate 0.5 nC.

Ionization injection: Trapping of electrons is a 1D effect and even non-trapped electrons can gain significant energy. This effect could be used to measure wakefields locally.

### 2) Dry run

The first instance of the dry run is scheduled for Tuesday, 6 September 2016.

Pre-requisite: AWAKE SPS cycle to be installed in SPS Telegram in the morning → **Action: Edda.**

Following equipment and software will be tested:

- OASIS crate 'cfc-tsg4-csaos11' with signals from Misha:
  - Check signals display on OASIS viewer.
  - → **Action: Misha sends an email to Anastasiya and Benjamin to confirm the readiness.**
  - The OASIS contact person is Benjamin Ninet.
- Laser line:
  - Check controls from WSET /KNOB
  - Check logged data
- RF setting for laser synchronization (to be confirmed):
  - Check controls from WSET.
  - → **Action: Edda confirms the request with Heiko.**
- Integration of class reader:
  - Check one use-case ('Rubidium density' file reader) in the fixed display. This test will check:
    1. Samba installation between CFC-TSG41-XEASTREAK and MPP-AWAKEPC01 (or 03).
    2. Publication of TT41.AWAKE-PLASMA-SPECTRO-UP and TT41.AWAKE-PLASMA-SPECTRO-DOWN.
    3. Publications should be received by Fixed Display, Event Builder and Concentrator
    4. Concentrator should calculate the density gradient out of these 2 publications and republish it to both Event Builder and Fixed Display
      - → **Action: The names of all windows machines should be given to Alasdair Blair.**
- Camera motor control:
  - BI card: Check BI devices controls from WSET/KNOB. → **Action: Lars sends an email to Roman.**
  - MPP cards: check controls from WSET/KNOB (not yet confirmed).
- Integration in fix display of OTR streak camera data (not yet confirmed):
  - → **Action: BI confirms with Roman.**
- OTR and CTR diagnostics (not yet confirmed):
  - Test the system with 10 Hz synchronized triggers.
  - The work on the LHC fast pulse (1V, 5ns width) to TTL converter has been completed by Heiko.
  - → **Action: Ioan or the BE-CO Hardware installation team provides the RF/TTL converter. Misha checks the status with Ioan.**

The information about the delay between the laser and proton beam will come from RF.

→ **Action: Roman checks with Heiko if the information is already available.**

Calculations of the density measurement should be done in Veronica's class and Veronica then provides the information. → **Action: Falk/Fabian makes an agreement with Veronica.**

There will be another dry-run planned in October/November, 2016, that will cover the equipment relevant for the plasma cell.

### 3) Update from BI

<https://indico.cern.ch/event/563782/contributions/2285181/attachments/1328137/1994687/BI.update.Aug2016.pdf>

The BI streak camera has been commissioned and the laser pulse has been observed. The estimated jitter was 10 ps. To be completed: remote operation, and going to shorter temporal windows. One BI and two MPP cards have been installed and operate five motors per card. For the BI card the instantiation has been completed and the devices are accessible via FESA, for the MPP cards the instantiation is pending. The MPP motors –at the moment- can only be controlled remotely via an expert application, but not via FESA. All BTV's are operational. BTV.412350 needs to be realigned after a replacement of the mirror motor.

### 4) Commissioning of OTR and CTR diagnostics during 2 week proton run from 19 September 2016

[https://indico.cern.ch/event/563782/contributions/2278309/attachments/1328204/1994726/Diagnostics\\_comissioning\\_for\\_p-run\\_19Sept.pdf](https://indico.cern.ch/event/563782/contributions/2278309/attachments/1328204/1994726/Diagnostics_comissioning_for_p-run_19Sept.pdf)

Misha summarized what has been done during the commissioning of the CTR/OTR commissioning and what still needs to be done (see presentation slide 3 and 4). The optical lines are currently aligned to the He:Ne laser but still need to be aligned to the proton trajectory. This will be done by first aligning the TiSa laser with the proton beam and then aligning the optical line with the TiSa laser. Misha additionally requested a 10 Hz trigger signal to set up the equipment → **Action: Confirm status with Ioan Koszar.**

### 5) A.O.B.

Concerning all people who are planning measurements during beam-time in September: → **Action: Send a list of all tasks that you plan to do to Janet/Chiara/Edda, how much time you need, additional beam requirements and the responsible person.**

Eight additional triggers will be ready by next week.

**Next meeting**

The next Secondary Beam Line Meeting will take place on the **12<sup>th</sup> of September 2016 at 15:30 in B530-R-28**. A detailed agenda will be sent out in due time.

Marlene and Edda 31/08/2016