

Minutes of the Linac4 Diagnostics Working Group Meeting held on 6 October 2008

Present: U.Raich, L.Soby, F.Lenardon, A.Lokhovitskiy, C.Dutriat, E.Bravin, I.Kozsar, R.Jones, C.Carli, K.Hanke, B.Mikulec.

Agenda:

1. Communications
2. Follow-up of open actions
3. BI/CO interface (I.Kozsar)
4. Pickups for Linac4-to-PSB transfer lines - preliminary findings (L.Soby)
5. AOB

1. Communications

K.Hanke reported briefly from the Linac2008 conference. There were some interesting contributions concerning diagnostics of H- beams, notably TUP084 by C.Gabor on transverse emittance diagnostics using photo detachment inside a dipole magnet. It will be studied whether such a diagnostics is feasible at the end of the linac, using the first horizontal bending magnet of the transfer line. C.Gabor will be provided with the Linac4 parameters to do a first feasibility check, and possibly be invited to CERN at a later stage.

Another presentation dealt with measuring the energy spread of H- bunches using photo detachment and collecting the electrons on a Faraday Cup with different repeller voltages.

2. Follow-up of open actions

Emittance meter: U.Raich will contact D.Gerard this week to get information on the assembly status of the emittance meter. E.Bravin mentioned that the Marie-Curie fellow will start his contract on November 1st; one can hope for first simulation results towards the end of this year. A.Lokhovitskiy reported that the prototype of the FESA server is available; all the interfaces are agreed and a prototype LabView application has been written as well. He requested a complete test system for detailed evaluation of the software. After this meeting U.Raich informed us that D.Gerard is planning to put together the detector until the end of the month. A VME crate has been found and U.Raich will discuss with R.Scrivens its installation at the 3 MeV test stand.

Power supply and cabling for emittance meter: A -1 kV and +300 V power supply is available (E.Bravin, C.Dutriat). The cabling for the emittance meter (FC, SEMgrid, slit) still has to be sorted out; C.Dutriat volunteered to take care of this and to contact C.Rossi.

Work package description, EVM document, budget breakdown: this is underway and has to be finished until the end of the week as U.Raich will give a presentation as work package holder next week.

BLMs: No news. The loss distribution simulated by E.Sargsyan should be presented at one of the upcoming meetings to finalise the position of the BLMs. The required BLMs in the PSB injection region should be included in this context.

Feshenko monitor: There is an approximate cost estimate for the Feshenko monitor available, but now an official offer should be obtained (U.Raich will follow this up). It should also be clarified if any kind of control and/or application will be included in the offer. Otherwise this has to be added to the list of software to be developed.

3 MeV measurement line: U.Raich has already asked for information on this subject, but received no reply so far. He will follow this up as it becomes urgent to get an answer.

Dump designs: There is no manpower available before the end of this year.

Drawings: No manpower before middle of next year; K.Hanke has made clear that the drawings for the movable bunch are on top of the priority list.

3. BI/CO interface

I.Kozsar, who is the new CO linkman for the Linac4 project replacing J.Serrano, brought up some issues concerning the interface between BI and CO (see his presentation BI-CO_interface_IK.pdf). As an example, interlocks have for the moment not yet been considered, but will evidently be needed for operation with Linac4 (transformers, BLMs...).

I.Kozsar mentioned that crates and timing cards will have to be financed from BI budget. The standard CO timing modules can work with fast signals up to 50 MHz. Fast timings are needed for the pickups and the Feshenko monitor, but perhaps lower harmonics of 352 MHz can be used for this purpose. The RF needs with respect to this subject should also be clarified. It is important to work on a concept for the distribution of the fast timing signals (coaxial cables, fibres??) and take into account not only Linac4, but also the transfer lines and the future SPL.

It was clarified that the Booster will be master for the timing system with the current set of users (PSB timing domain). Discussion with A.Lombardi and R.Scrivens after the meeting made it clear that Linac4 should also be operated in ppm mode.

For the 3 MeV test stand a special timing system with 1 user will be applied.

With the official inauguration of the Linac4 construction work on the 16th of October it will soon be required to provide detailed cable plannings (amount, diameter, routing etc.). U.Raich confirmed that most of this work has already been done (ethernet, signal cables...), but for example cables needed for OASIS have not yet been considered at all. He will try to put together the BI demand and will on this occasion again check the total cable inventory.

L.Soby proposed to provide where possible digital signals already in the FESA class of the instrument and use OASIS only for visualisation.

Assigned to	Start date	Description	State	Result
U.Raich	2008-10-10	Investigate which signals should be transferred to OASIS and prepare the associated cable inventory. Check once more the completeness of the cable infrastructure planning.		edit

Concerning frontends and application servers CO will take care of the procurement, but BI has to provide the budget. The BI budget has no budget item foreseen for application servers, but maybe they are not needed. As is already common practice, CO will deliver the FESA classes and provide the INCA framework, and BI will be responsible for frontend software and OP for writing application software.

4. Pickups for Linac4-to-PSB transfer lines - preliminary findings

L.Soby presented preliminary studies concerning the pickups in the Linac4-to-PSB transfer lines (see Linac4_PU_transferline_LS.pdf). He showed that for a 400 us beam pulse a low frequency cutoff at 15 Hz and 10 ms rise-time would be adapted, but for example a rise-time of 1 ms would lead to an important droop (~30%). He presented different PU types: the new inductive PUs are not suited due to their time constant of 1 ms (this means that one cannot replace the beam current measurement done with transformers by a current measurement with less expensive PUs...); capacitive PUs show very good linearity and sensitivity, but are

unfortunately very sensitive to spray particles; strip line and button PUs could be considered (have 100 LEP button PUs available), but it has to be checked how much of the 352 MHz frequency components is still present in the transfer lines (remark: B.Mikulec has contacted A.Lombardi on this subject).

There are 18 PUs installed in the old Linac2-to-PSB transfer line with a time constant of 600 us. Maybe this time-constant could be compensated in the electronics; measurements are planned during this shutdown to advance on this subject.

The noise level specification of the old PUs was 25 mA mm which would correspond to 0.6 mm for a 40 mA pulse; the measured value corresponds to ~0.2 mm rms for 40 mA. This should be sufficient as the rms value concerns the pure signal/noise ratio; the value that counts will even be smaller due to signal integration.

In any case the acquisition system of the old PUs has to be changed for operation with Linac4! There should only be one acquisition system for all Linac4 PUs...

-- BettinaMikulec - 06 Oct 2008

- [BI-CO_interface_IK.pdf](#): BI/CO interface
- [Linac4_PU_transferline_LS.pdf](#): Study of pickups for Linac4 to PSB transfer lines.

This topic: [SPL > Minutes06October2008](#)

Topic revision: r6 - 2008-10-10 - BettinaMikulec



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