Beam Commissioning Working Group

Minutes for 24 August 2018

Present: V. Kain, **G. Rumolo**, S. Albright, H. Damerau, G. P. Di Giovanni, K. Hanke, A. Huschauer, A. Lasheen, K. Li, B. Mikulec, G. Papotti,

Meeting objectives

Status report on Linac4 Hardware Commissioning and plans for SPS reference measurements.

Approval of Minutes and Matters Arising - V. Kain

Minutes of 4th August accepted without comment.

- Follow up points (on the TWiki page) discussed. Of particular importance is the order of beams to be provided by the different accelerators during beam commissioning, a first draft of beam priorities will be developed soon.
- B. Mikulec asks when a list of SPS priorities will be available, this will be provided by K. Li after the next integration meeting. B. Mikulec explains that the PSB are starting their planning process and they would benefit from this information as soon as possible.
- B. Mikulec that for the PSB it would be helpful to leave beams requiring h=2 as late as possible, but V. Kain says the SPS would like MTE as soon as possible. H. Damerau asks if an MTE-like beam with every other bucket filled would be a suitable half way point as this would not require splitting in the PSB but might be sufficient for the SPS requirements. A. Huschauer thinks this could be tested before LS2, V. Kain, B. Mikulec and H. Damerau agree that in principle this should be possible to test.
- A request came from TE to clarify requirements for individual system tests. Wherever possible the tests will be carried out during the shut down, equipment groups and experts will handle the safety with no specific dedicated period for individual system tests during the shutdown period. Some of the tests will still have to happen during hardware commissioning but only where necessary. This is due to the safety requirements. B. Mikulec explains that this approach can work for the LS2, but not for the YETS afterwards, as the available time would be too short. And a longer hardware commissioning period would be necessary and hence will require operators to be available. This in turn will again limit the time available for other tasks and impact the work they can do during a YETS. V. Kain agrees and says that the latest discussion does not necessarily reflect what will happen in regards to YETS post-LS2.

Linac4 Hardware Commissioning - B. Mikulec

Presentation

- The commissioning checklist is separated into pre-requisities and hardware commissioning, pre-requisite tests are nearly complete.
- V. Kain asks if the lattice incorporated into JMAD etc refers to everything after the last cavity and along the transfer line, B. Mikulec confirms this.

- Source and RF commissioning are done by specialists and will be marked complete at the end of the testing process. No detailed tests are available in the check lists. G. Rumolo asks if there's any way of tracking the progress nevertheless, B. Mikulec says it is to be discussed but is not easy.

- Failures in hardware commissioning list come from a power converter interlock and the autopilot. The problems with the source autopilot are long lasting problem and there is a plan to solve these.

- V. Kain asks how many tests there might be in the future for the RF, B. Mikulec says it is currently about 10, but this will be split further in the future. The majority of the LINAC4 tests will be RF related. In the current check lists they constitute only a few percent.

- It is emphasised that this commissioning process has shown the checklists to be a useful tool, in particular it lead to problems being identified and solved faster than they may otherwise have been.

Discussion

- V. Kain asks how much OP will be able take over RF commissioning in the future. B. Mikulec says not much practical work as this requires experts, but they can provide administrative support. G. Rumolo asks about the source, B. Mikulec says they have worked on a checklist and procedure with the expert, which is being finalised but it still needs to be primarily handled by experts.

- V. Kain asks how settings are handled for systems which can vary with destination e.g. the chopper. B. Mikulec explains the settings will be propogated to all cycles when finalised, some expert settings like masking are only visible to experts but it is being requested that they will be made readable for operations.

SPS Reference Measurements - K. Li

Presentation

- Status update on planned and taken references. The list is not complete yet. Ions for example are not treated yet.

- In tables giving the status of reference measurements the orange box refers to data that has been taken but is not yet organised and stored correctly, the grey box refers to data that has been started but requires additional work (possibly with an expert), the red boxes refer to data that requires work particularly under carefully controlled conditions and possibly dedicated MD time.

- G. Papotti asks how measurements of bunch rotation for the AWAKE are planned and offers to add it to the list of measurements to do in the cage as that will give the best result, K. Li agrees that this would be best.

- G. Papotti says some COAST measurements have been taken and will be logged, it is agreed that more data is required.

Discussion

- G. Papotti wants to be present when bunch-by-bunch emittance blow-up measurements are done so she can include the longitudinal measurements.
- V. Kain says as discussed for other machines it may be beneficial to dedicate a week to focus on references. G. Papotti asks if a date is in mind, V. Kain says not yet.
- K. Hanke says the PS plan to distribute the acquisitions over the rest of the run rather than aiming for a crash program type approach.
- G. Papotti asks why the mountain range is desired for the fixed target beams, K. Li says it is just to have a quick reference, G. Papotti thinks it is worth doing a detailed measurement in addition as will be done for the other beams.
- G. Rumolo says there are two distinct types of meaurements with specific purpose. The beam doc type measurements give a quick reference via something like a screenshot to quickly confirm that e.g. a beam looks as expected, which will be particularly helpful for new operators. The more detailed measurements are needed for things like impedance measurements to compare machine performance before and after LS2 where significant changes are planned. In the transverse plane measurements like tune shift with intensity are required, G. Papotti already plans to measure longitudinal effects.
- G. Papotti says the ions still need to be included, V. Kain agrees.
- K. Li says various parameters need to be measured for the ion slow extractions with the different energies. A detailed list needs to be prepared.

General Discussion

- G.P. Di Giovanni asks if the plan is to use the tool of A. Rey for acquiring, storing and analysing reference data. K. Li agrees. The tool is however for catalogue and storage of results, the acquisition and data analysis will be done separately. It can be included as plugin however in any application software and hence also analysis software. G.P. Di Giovanni asks if the tool is intended for use in all machines, V. Kain says yes, further details will come next week.

Next meeting 1600 on the 31st of August with presentations on Linac4 beam commissioning and the reference measurement tool.