ELENA:

Commissioning Meeting

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1 INTRODUCTION

The minutes of the previous meeting were approved.

2 GBAR PROGRESS

The beam coming from ELENA is going through a drift tube before reaching the MCP where the recombination will be done.

P. Perez is showing an example of beam spot on the MCP. The waveforms show that the beam is maybe not well aligned (on axis w.r.t. the drift tube). This is a real issue for GBAR due to the Einzel lens effect.

The conditioning up to 100 kV is progressing slowly due to sparking.

The tube has been aligned but not by the geometers. One of the electrodes inside the tube is also off axis.

3 PROGRESS WITH PBARS AND H- BEAMS

In mid July L. Ponce has shown that the efficiency went up significantly within one month.

The present beam delivered to GBAR is 600ns long. LLRF pick-up based intensity measurement is not yet operational.

Even if it has not been foreseen, it is possible to do a bunch rotation before ejection. It could produces a 200 ns bunch.

There is a possible saturation of the ADC of the LLRF TPU signal that should be checked. It could be the reason of the oscillation detected.

H- status is that it is possible to produce a 1us beam. A “real” acceleration cycle has been performed:

- From 85 keV to 100 keV
- From 100 keV to 100 MeV/c
- Back to 100 keV.

It seems that it is possible to have beam even for energies lower than 85kV.

Mains observational results are:

- DHZ7042 is an extremely strong corrector for the ELENA injection line.
    - We reduced its strength by acting on BHZ7010 upstream

- It has a huge impact on alignment downstream

- After steering we found (not optimal) that we have less than 1 mm/A steering on BTV118 for each quadrupole of the LNI line (starting from LNI.QFN07). The Injection line optics matching is still unknown.

- The double spot visible on LNI.BTV15 is confirmed to be a reflection

For the GBAR line steering, the quadrupole voltages used where not symmetric on each quadrupole plate. It is possible to centre the beam in the drift tube but the beam spot is still not great.

After a few adjustments, H and V profiles have been seen on the GBAR SEM grid. They now have to cbeked w.r.t the theoretical optic. There is still room for improvement: some shots are not detected by the SEM.

L. Bojtar simulations show strong resonances lines. The tune diagram with H- beam has been explored. A diagram of the lifetime as a function of different quadrupole settings at 85 keV has been done.

On the source side the extraction pulse used to extract H- from the plasma has been studied. Some perturbation (ringing) has been observed when using specific parameters combinations (width, intensity). It could be useful to use the BPMs to verify the beam structure (increasing septa and disabling the injection kicker).

There are still some issues that must be addressed: There is a jitter on the beam arrival at GBAR due to some LLRF reference frequencies generation (maybe solved already). We need to program a factor 2 higher voltage to keep H- beam and we don't know why…

There were some attempt to measure the chromaticity in both planes. We also tried to align the electron beam and the pbar beam in the cooler. Cooling tests on the H- beam should be started next.

4 E-COOLER COOLING

Clear evidence of cooling has been seen on the beam profile.

The effects are not as big as we would have expected. Bunch beam cooling has been tested as well and the results are also visible.

The 31st of august the fine-tune coils were switched on for the first time.

A study to align the e-beam with the pbar beam was done creating a local bump around the e-cooler region.

The conclusion is that there is still a lot of work to do.

5 AOB

C. Carli says that we should consider generating protons with the source if the AD E-cooler collector has to be replaced.