

ELENA:
Combined BPPC and commissioning meeting

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<u>Presence</u>		
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Pierre	GRANDEPANGE	BE/BI
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1 INTRODUCTION

The minutes of the previous meeting were approved.

2 RECENT BEAM PROGRESS

Pbar shifts were mainly used for RF and scraper system commissioning. The BBQ tune measurement system was also tested with no excitation right after injection.

Regular jumps spaced by 160ms were detected on the BPMs signals with Pbars circulation at the injection plateau. This is not yet understood.

M.E. Angoletta has detected a 2kHz occasional frequency offset at 5.3 MeV. It seems that it has been solved by the B-train high marker timing adjustment.

H- trajectory and injection is still not reproducible. So far the H- are not very useful for beam commissioning for the moment.

2 days were used for geodesic measurements of the survey system ELENA was switched off during this time.

Next steps are:

Consolidation of injection line and injection into ring

- Improved reproducibility of injection – efficiency should be increased (H-)
- Further studies to understand and empirically improve line and injection

First 85 keV beam (H- and/or protons) for GBAR

- Requires profile monitors – 2 out of 3 installed. No readout electronics yet...
- Setting up of RF synchro for Gbar H- ejection

Pbar transfer from AD

- Set-up RF synchro

(Acceleration) Deceleration

- Setting up of LL RF; phase and radial loops

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- LPU signal quality vs. phase/radial loops

Setting up of antiproton cycle

- Requires electron cooler to be available and installed

Commissioning of instrumentation and understanding machine at low energy

- Orbit system – consolidate orbit correction (some corrections done successfully) and orbit response studies
- Tomoscope – observe bunching & independent intensity estimate)
- Tune (measurement and) corrections

3 RF PROGRESS

A new compensation table has been loaded in the firmware, to cover the whole frequency range of operation

Improved firmware for in-cycle Oasis data retrieval

New components were installed: cables, fanout modules for injection/ extraction, sychro, CTRV/timings for Highland module operation with ELENA and an improved DSP software to select TPU Sigma / LPU as phase loop input.

Operation with the source is still not possible due to the very poor beam lifetime.

The AD-ELENA synchronization loop is still not operational with PBar. The AD-ELENA bunch to bucket transfer cant be achieved yet but the good beam lifetime make the debunched beam capture possible. There are still problem with Btrain calibration and shot to shot stability.

Next tasks are:

To solve the problem related with the Btrain oscillation

To improve the ions lifetime

To re-calibrate the servo-loop

To understand the problem related with the phase loop inputs.

To integrate LLRF FESA classes with the RF Cycle editor

Once the source beam will be stable, problems solved and the radial/phase loops commissioned with source beam, it will be possible to implement and commission the extraction synchronisation loop.

B. Lefort says that Ralf Gabel is aware of the instability issues and that he wants to come to try to do some tests. We should try to schedule 3 consecutives days where R. Gebel could come and uses the source. B. Lefort also adds that the H- beam production is delayed w.r.t. the injection kicker and that it could be possible that we are using an edge of the kicker pulse instead of the plateau. The kicker is also fluctuating by 20ns shot to shot.

4 BEAM PROFILE MEASUREMENT

Pierre Grandemange is showing the last results of the scraping system.

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An Inspector panel has been developed to shows MCPs and scintillators readouts.

The delay issue between H & V blades has been solved.

The motion speed has been checked and set to 40mm/s.

One of the MCP is not really functional and should be replaced by a spare in the future. There are still 5 sensors working.

The system has been commissioned and is now ready to be tested with H-. Bruno Dupuy is already integrating the system in the existing scraping application used in AD.

5 E-COOLER MAGNETIC MEASUREMENTS

Tesla measurement objectives were:

- To measure each standard solenoid to determine how to place the solenoids during assembly .
- To measure all the other magnetic circuits.
- To check the magnetic model proposed by TESLA Engineering.
- To create a Field map of the electron cooler assembly.

A lakeshore 460 Gaussmeter was used for the test, the Hall probes were precisely aligned using an autocollimator and a spider fixture.

First measurement run shows that the measurements were not reproducible (up to 0.5 G variation) it was due to the probe holder instability. The nylon mount was replaced by aluminium.

The full assembly was measured. Some unexpected field variation (i.r.w.t. theoretical model) were detected

Looking at the Bx on axis measurement it is possible to assume that the offset difference is coming from systematic positioning error of the probe while the oscillation is coming from an incorrect use of the correctors.

As a conclusion, we can clearly say that probe alignment is very delicate. The correction of the vertical field component in the full assembly is problematic due to a random offset in the measurement (not present during the measurement of the individual solenoids). Anomalous behaviour of By and Bz in the vicinity of the toroid shielding and compact corrector magnet could be explained if the shielding was touching the yoke...

All magnetic elements have been individually measured on and off axis. Data are available in EXCEL file. The effect of the correction coils on the B field has been measured. Standard solenoid 2 has been chosen as the “drift” solenoid. Anomalous field behaviour needs to be investigated.

After receiving the TE/MSD certification for the electrical and hydraulic installation, the E-cooler will be mounted outside ELENA.

At this time it is difficult to estimate when e-cooler assembly in the AD hall can be started.

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C. Carli asks about the Fluor contamination of the thoroid vacuum chamber. Jean Cenede says that the test bench has been recalibrated and this problem should disappear. A. Sinturel says that this contamination will disappear with the NEG re-activation.

About the unexpected magnetic field components, C. Carli asks if it would be useful to try to simulate the effect on a circulating beam. G. Tranquile answers that XXXXXXXX

6 AOB

Tommy on behalf of all the ELENA project thanks Pierre Grandemange for his good work and wish him good luck for the future.