

LEReC 02/25/2016
Instrumentation Meeting
By Toby Miller

Minutes

- **BPMs**

Rob Michnoff presented the test results with the buttons, cables & electronics.

- RESULTS:
 - Use ERL 9mm buttons in Transport
 - Install local switches & amplifiers in tunnel
 - Note that the measurements were based on 78,000 samples averaged over 1 sec.
- Concerns:
 - Tests were made with 25mV pulse that is shorter than what is planned for. A model of the input filter needs to be made to study the expected response with longer bunches.
 - It was suggested to use a 78kHz side band around the 704MHz to avoid noise from the RF systems at the fundamental frequency.

- **Ion Clearing:**

- Bruce Dunham confirmed in an email that ion clearing was useful in surpassing an intensity limit at ~20mA between the Gun and Booster; where the gun would trip often on overcurrent before.

- **Emittance Measurement:**

- The ERL multislit mask will not work for LEReC. However, simulations by Chuyu & Jorg show that a mask with a 0.15mm slit width &, 2.5 mm spacing, can produce the following results for the 400keV beam:
 - Real emittance: 0.655251966295
 - Sampled emittance: 0.629857938323
 - Measured emittance: 0.623495500861
- Further study is planned for the two higher energies of 1.6 and 2.7 MeV.

- **Laser Mirrors:**

- Impedance due to the laser mirrors has been dramatically reduced by adding ferrite beneath the mirror.
- There is a current debate over using brittle ferrite versus a sliding ground contact that can produce particulates.
- Given no adjustability of the cathode surface angle, there is a risk that the reflected laser may fall outside of the range of motion of the laser extraction mirror.
- A comprehensive study of the angle tolerance of the cathode versus the available aperture of the reflected laser through the extraction mirror is required.
- Entry laser mirror now has all three axes of manually controlled motion (X, Y, Z) so that it can be inserted & retraced for on-axis cathode-laser tests. The exit laser mirror has only X & Y manually controlled motion.

- **Merger Dipole ripple & emittance**

- New ripple spectral studies show that considering only the contribution from the 60Hz ripple, the emittance blow up is only 1%, compared to the previously estimated 50% increase.
- We await a final decision on the use of the ERL 20A power supplies.