

PXIE Instrumentation Update

LEBT Instrumentation – *primary focus*

- Allison transverse emittance scanner
 - Drawings finished and parts out for bid
 - Assembly of one scanner at SNS starting in mid-September
 - Some testing of unit at SNS
 - 2nd scanner purchase in future
 - Scanner arrival at Fermilab in November
 - Readout, HV and control electronics being assembled now at Fermilab
 - Test readout, HV and motion control before scanner arrives
 - Modifying D-Pace vacuum chamber for LEBT commissioning
- Beam current measurements:
 1. Ion source current measurements using old e-cool Bergoz DCCT
 - Testing in lab
 - Initial readout with scope
 - Move to VME readout later
 2. Beam current toroid, scrappers and Faraday cup measurements
 - Initial readout with scope
 - Reuse HINS VME DAQ system
 - » Need software development/modification

PXIE Instrumentation Update (cont)

MEBT Instrumentation – *secondary focus*

- BPM system:
 - BPM housing prototype design nearly completed
 - Some components purchased (flanges, beam pipe, etc)
 - Waiting for 3D model from India to verify design
 - Cost for button pickups x2 higher than estimated
 - » Going out for new bids from other vendors
 - BPM performance specifications in development
 - Position, phase and intensity under assorted beam conditions
 - Two trajectories in MEBT chopper region
 - » Bunch-by-bunch measurements
 - » Synchronization of measurements at single bunch level across many instruments
 - BPM “standard” electronics to follow previous designs
 - BPM bunch-by-bunch electronics concepts being studied
 - Initial measurements with fast scopes

PXIE Instrumentation Update (cont)

MEBT Instrumentation (continued)

- Beam Current Measurements
 - Measurements from DC to MHz plus limited beamline space (and money) make choice of beam current instrumentation difficult
 - Proposal: *Can we use LEBT chopper to put a regular notch in beam to remove DC requirement? (FRIB plans to do this)*
 - For example, a 50 μ s beam notch at 120 Hz in beam
 - » Only drops 0.6% of beam
 - This would allow us to reuse HINS toroids
 - » ~ 30 Hz to few MHz BW
 - » Save money and beamline space
- Other MEBT instruments at concept stage
 - Wire scanners, laser wires, transverse emittance probes, extinction monitors
 - Focus on emittance probe and dense “6-pack” instrumentation region after RFQ
 - Limited by manpower and money

PXIE Instrumentation Update (cont)

- **HWR/SSR1 Instrumentation**
 - Cryogenic BPMs designed (Argonne)
 - BPM electronics similar to MEBT
- **HEBT Instrumentation** – only conceptual work
 - Most instruments leverage off of MEBT instrumentation

PASI postdoc to arrive in October for one year to work on PXIE instrumentation

- *Mostly to work on MEBT instrumentation issues*