

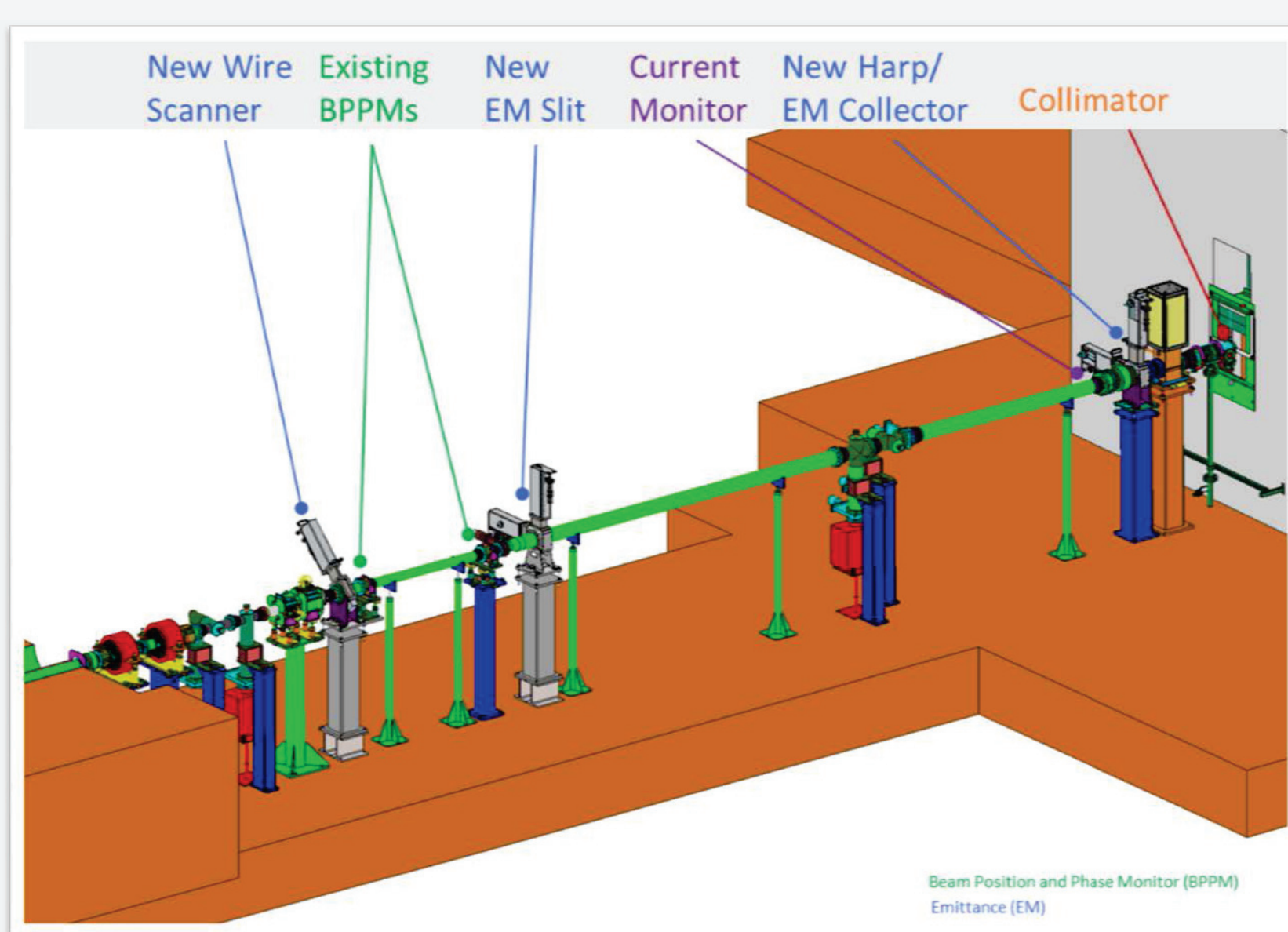
UPGRADES TO THE LANSCE ISOTOPE PRODUCTION FACILITIES BEAM DIAGNOSTICS *

H. Watkins, LANL, Los Alamos, NM 87545, USA

Abstract

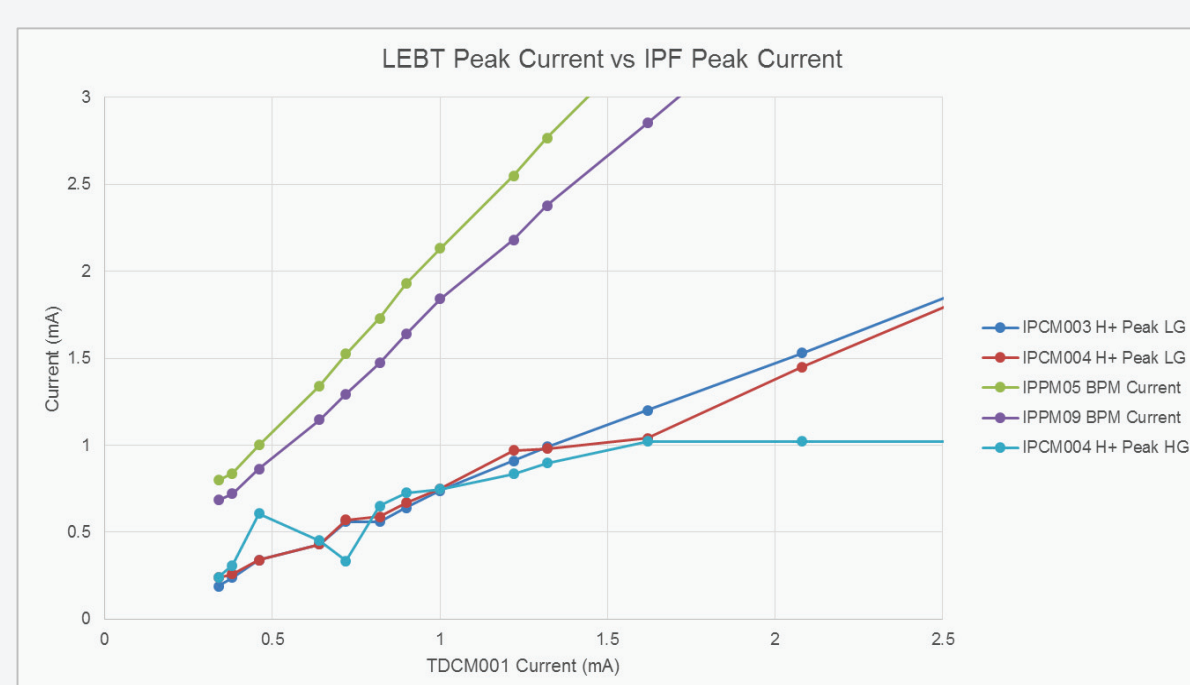
The Los Alamos Neutron Science Center (LANSCE) is currently upgrading the beam diagnostics capability for the Isotope Production Facility (IPF) as part of an Accelerator Improvement Project (AIP). Improvements to measurements of: beam profile, beam energy, beam current and collimator charge are under development. Upgrades include high density harps, emittance slits, wire-scanners, multi-segment adjustable collimator, data acquisition electronics and motion control electronics. These devices will be installed and commissioned for the 2017 run cycle. Details of the hardware design and system development are presented.

Isotope Production Facility Diagnostic Upgrade Locations



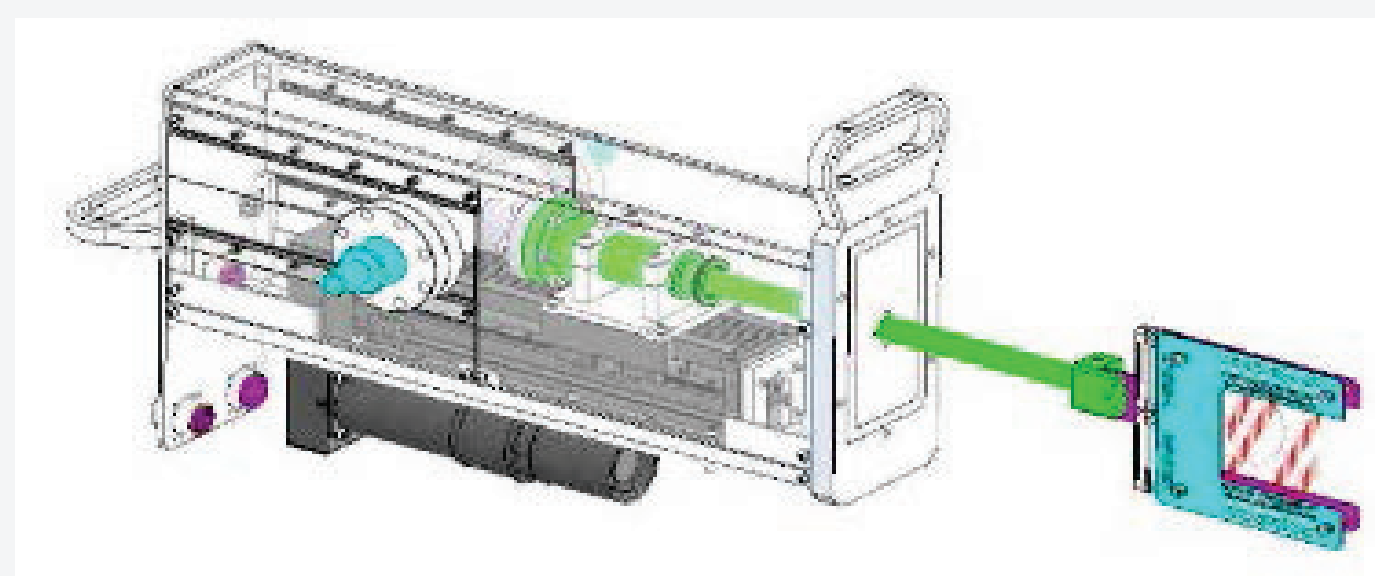
Beam Current

- Goal: Increase sensitivity of current measurements at IPF down to 100nA average.
- Installed a high sensitivity amplifier
- Interference at 72kHz observed causing variations in current measurement.

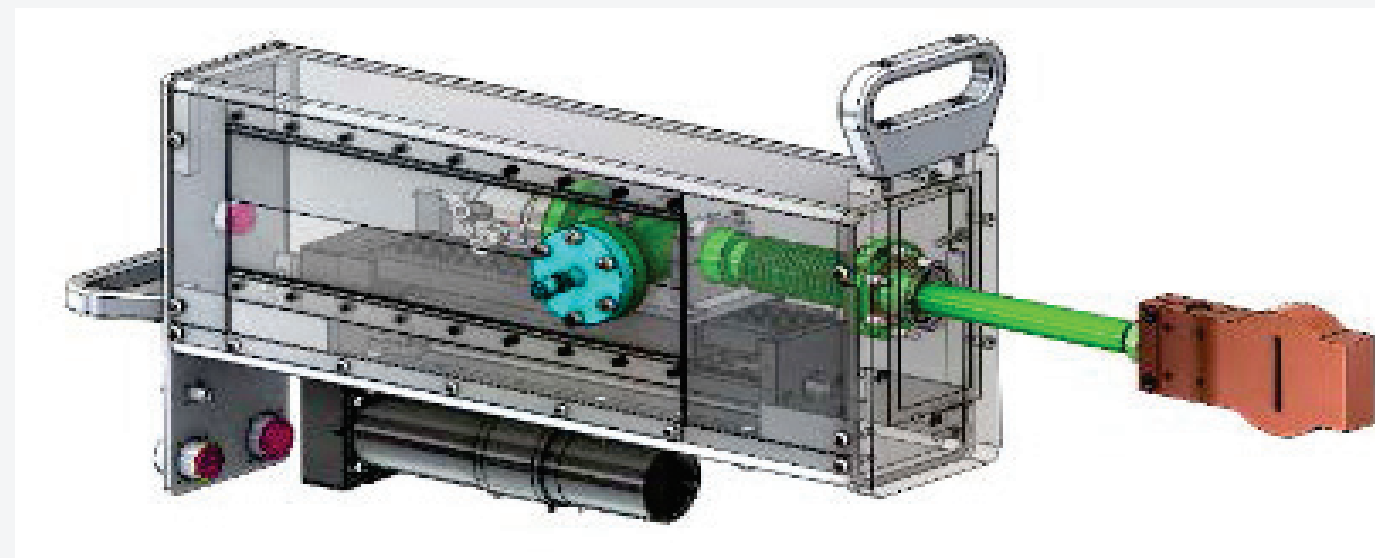


Profile Measurements

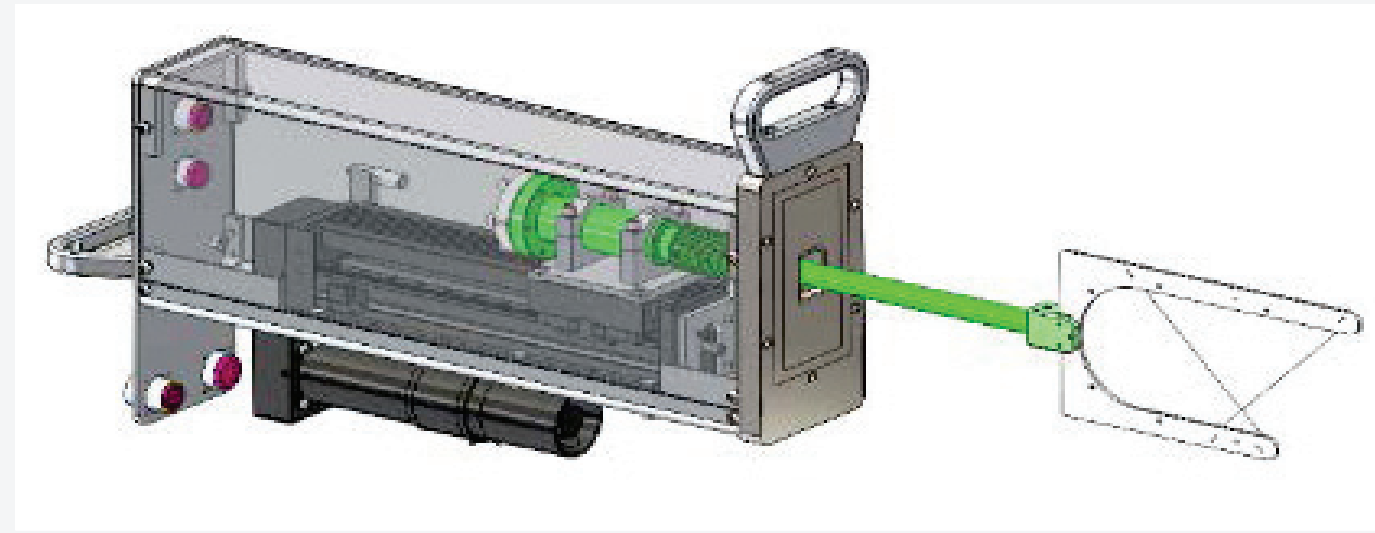
- Goal: Deploy three new profile measurements along the IPF beam line.
- Emittance scans, Profile Scans and Wire Scans
- Upgraded Data Acquisition and Analog Signal Conditioning



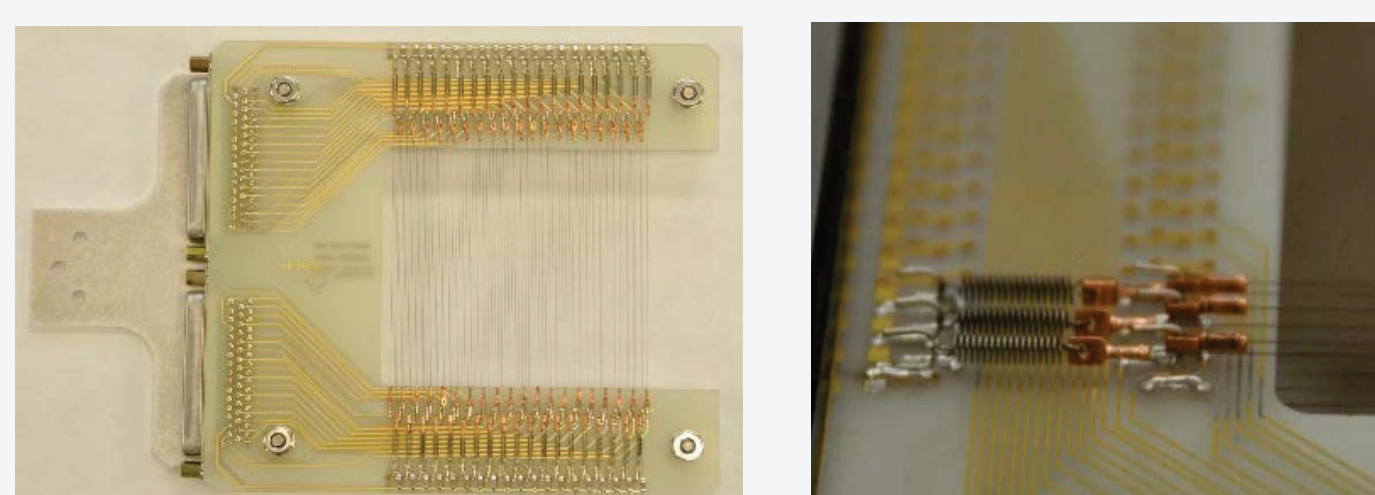
Harp – 77 wires at 1mm pitch



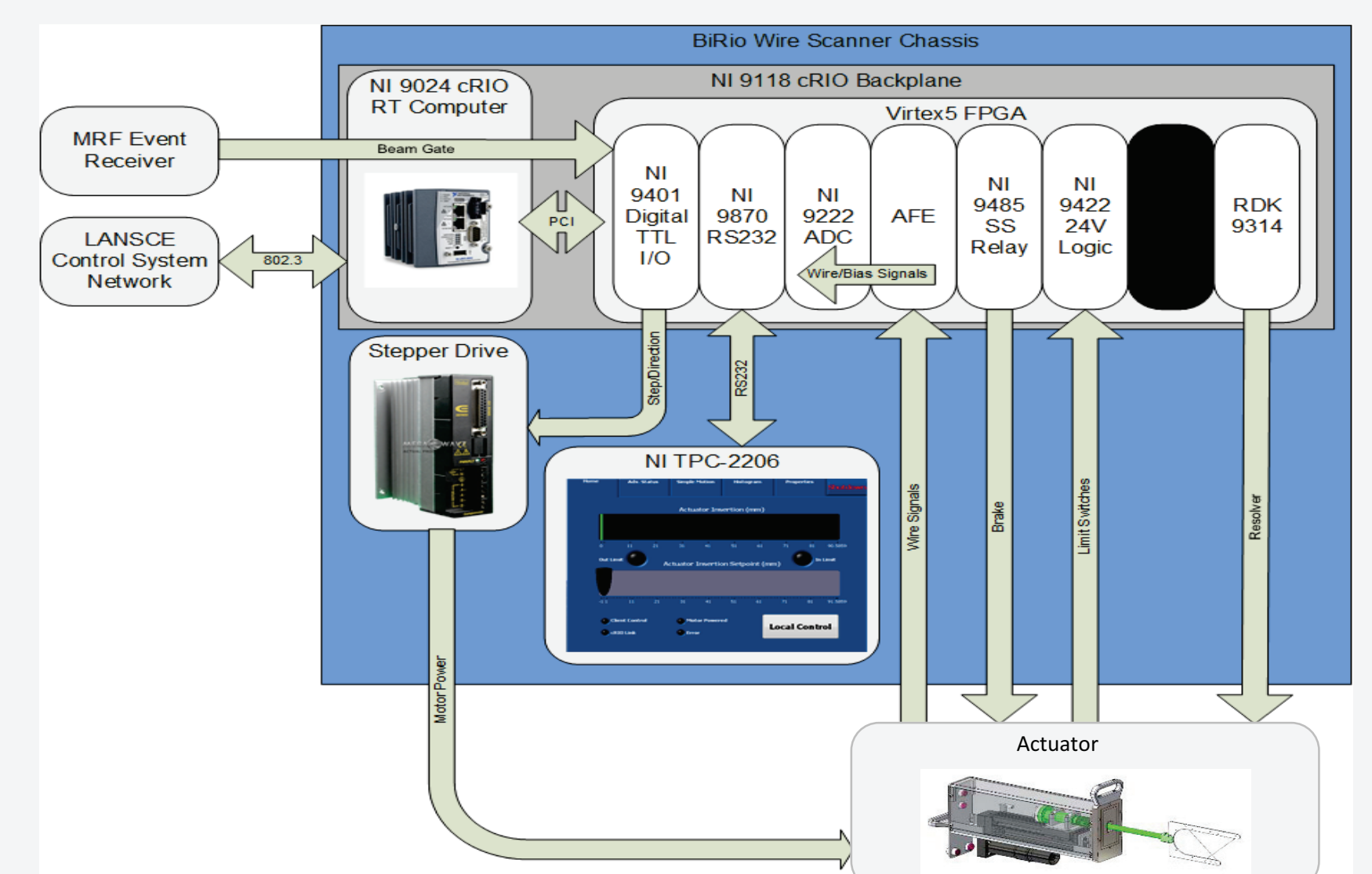
Slit – 20mil slit



Wire Scanner – Dual Axis



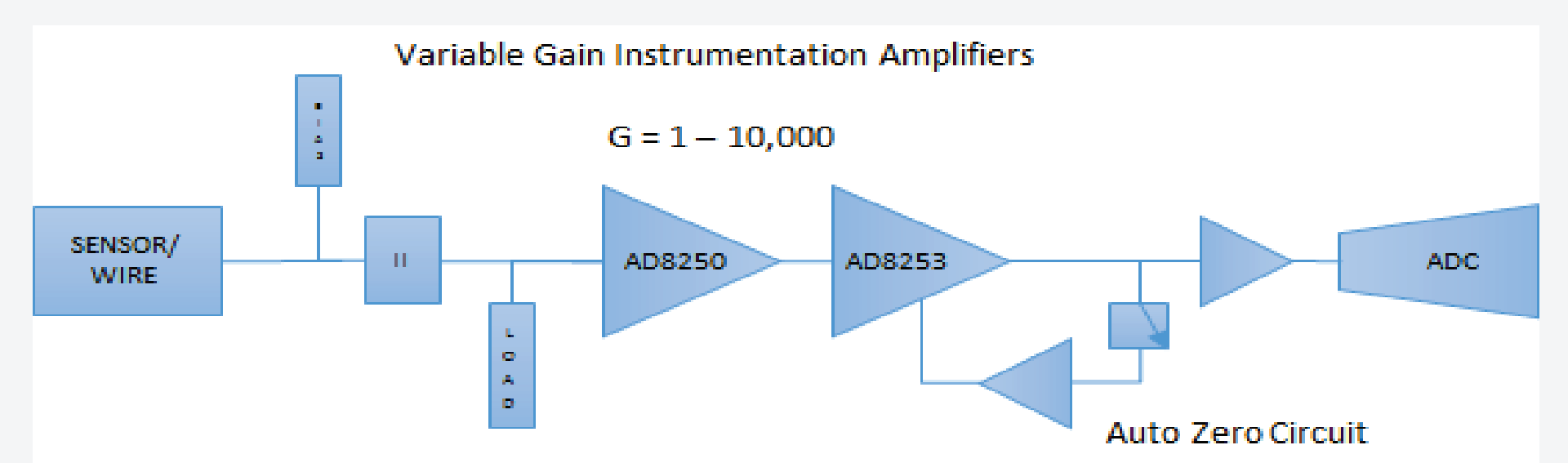
High Density Harp PCB Assembly



Control and Data Acquisition

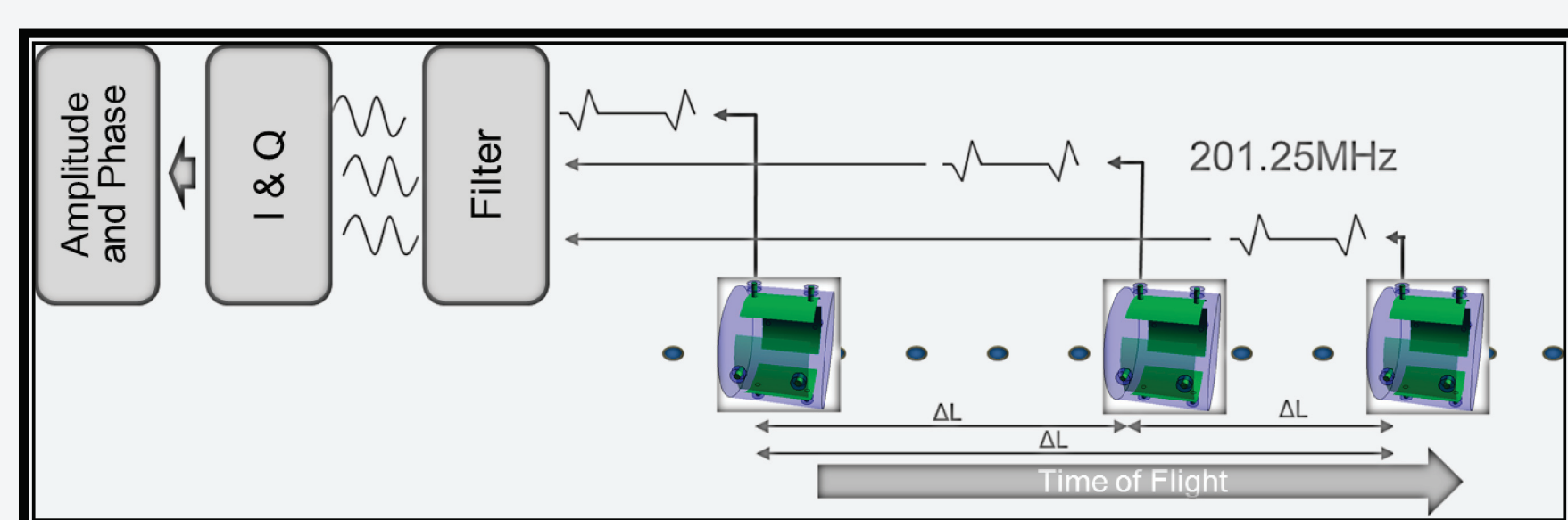


Electronics Chassis



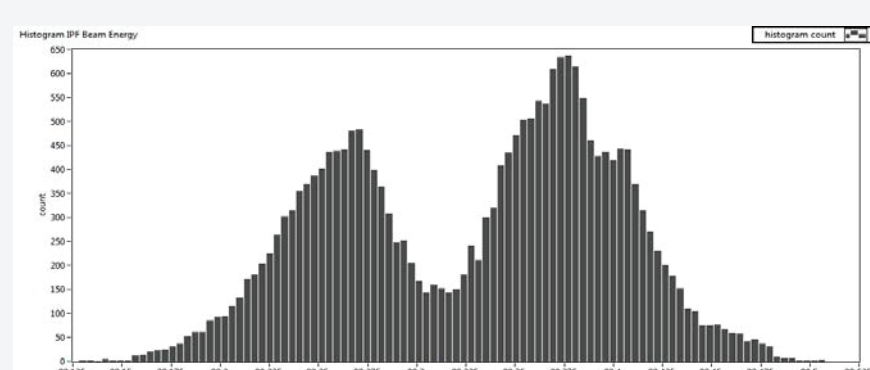
Analog Signal Conditioning Circuit

Beam Energy

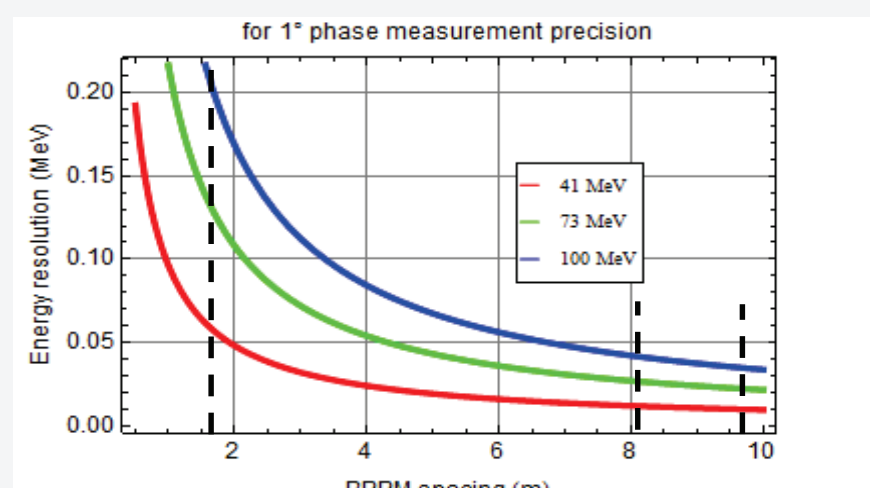


Beam Phase Measurement

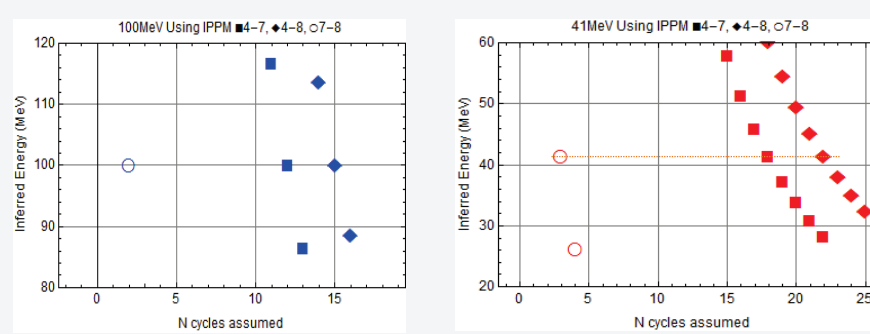
- Goal: Measure beam energy at 41MeV, 72MeV and 100MeV with 50keV resolution.
- 3 monitor locations provide coarse and fine resolution measurements.



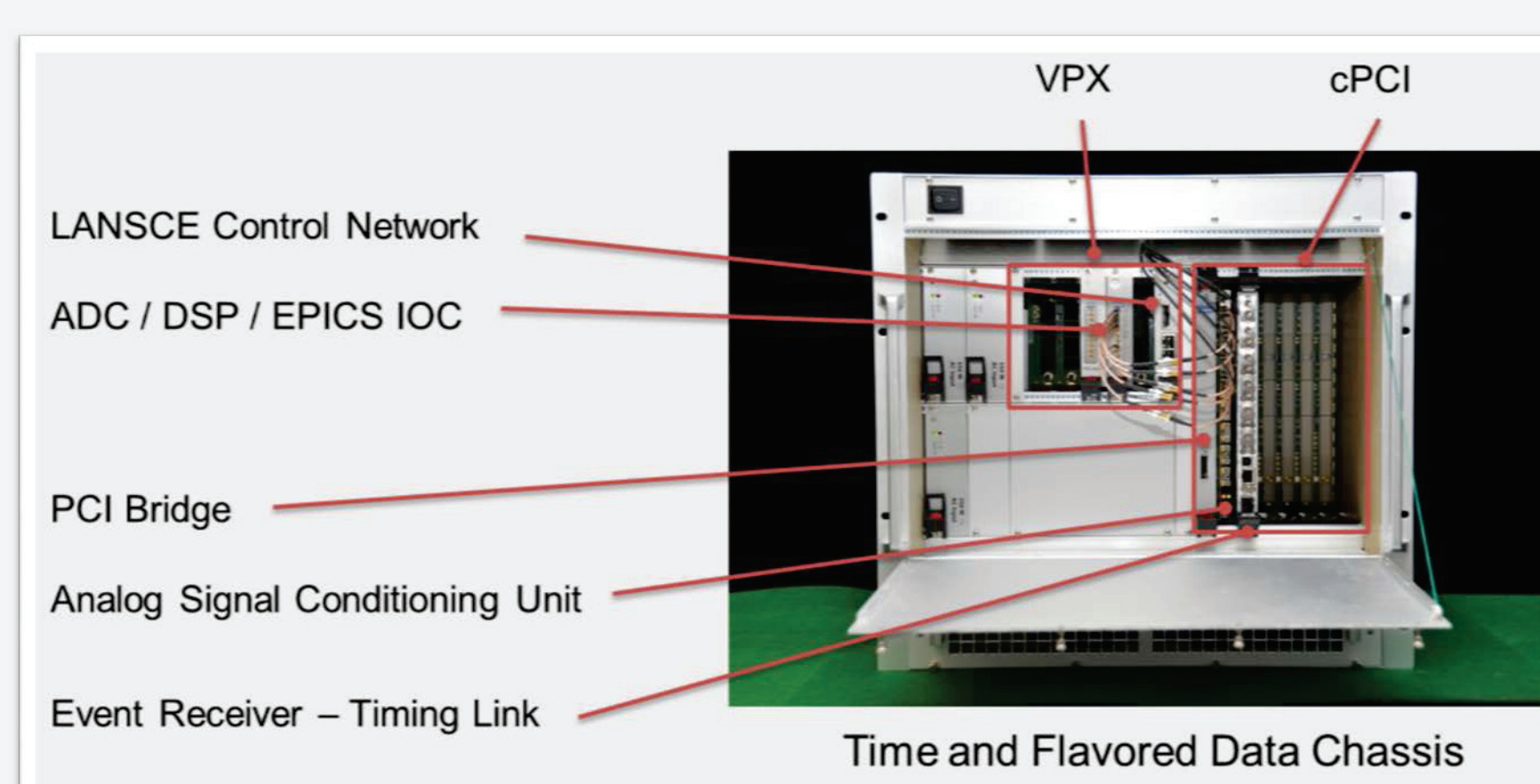
Prototype measurements: Energy Histogram



Beam Energy Resolution vs Spacing

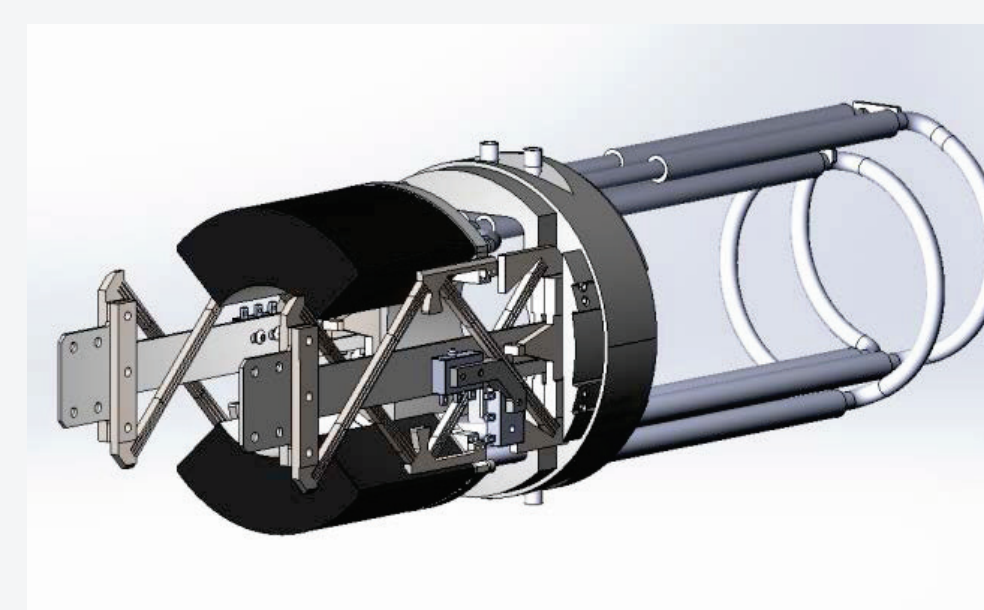


Number of Cycles Assumed vs Energy

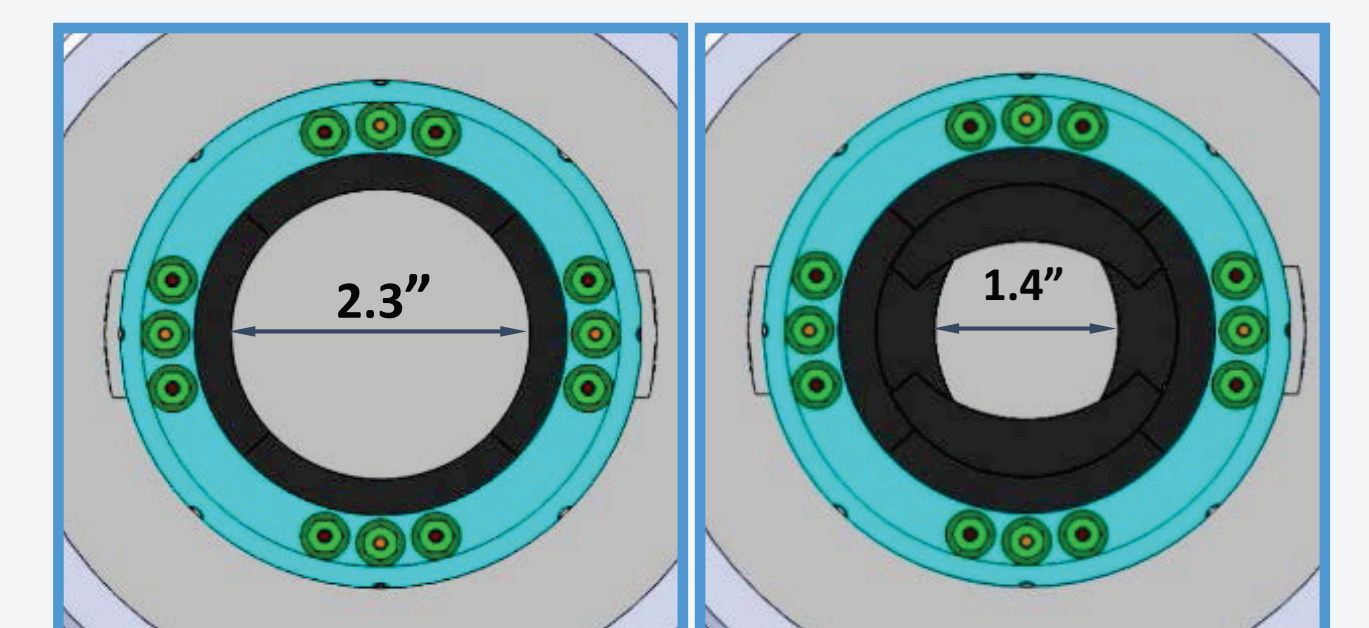


Beam Phase Electronics

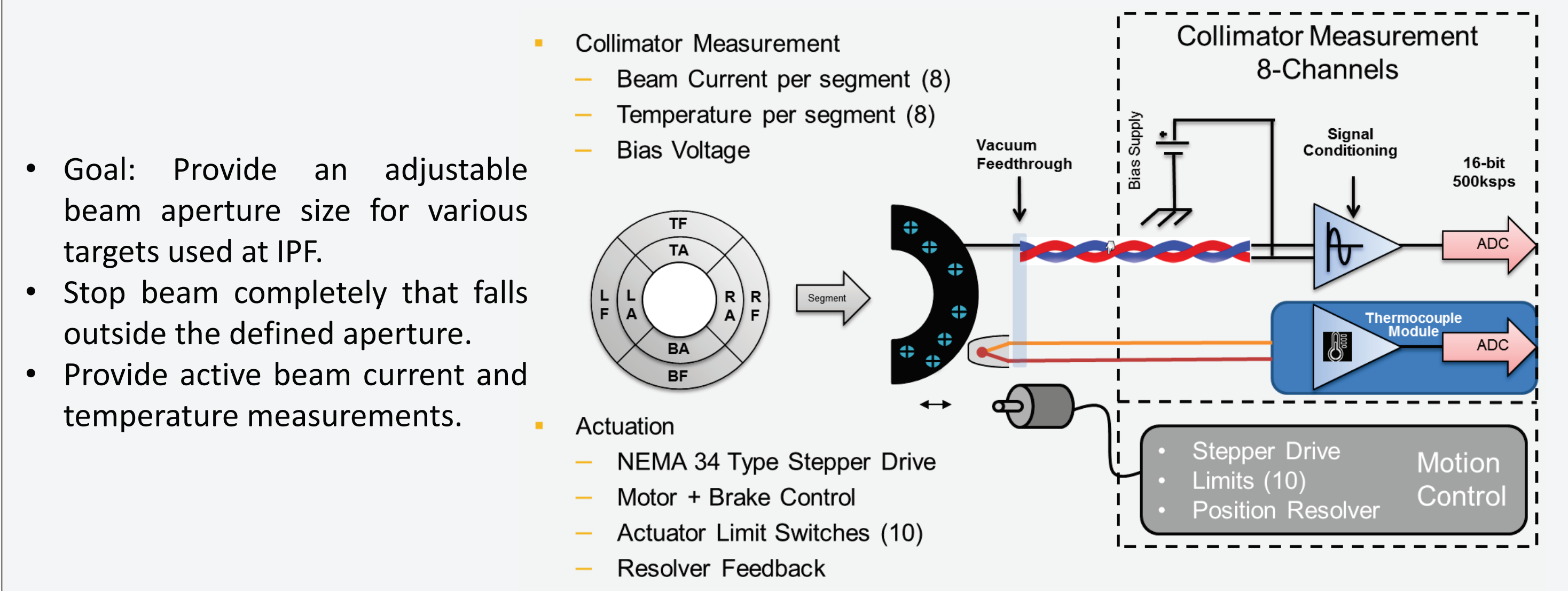
Collimator



Adjustable Flexure



Aperture Range



Electronics

* Work supported by the United States Department of Energy, Office of Science, Office of Nuclear Physics, via funding from the Isotope Development and Production for Research and Applications subprogram.