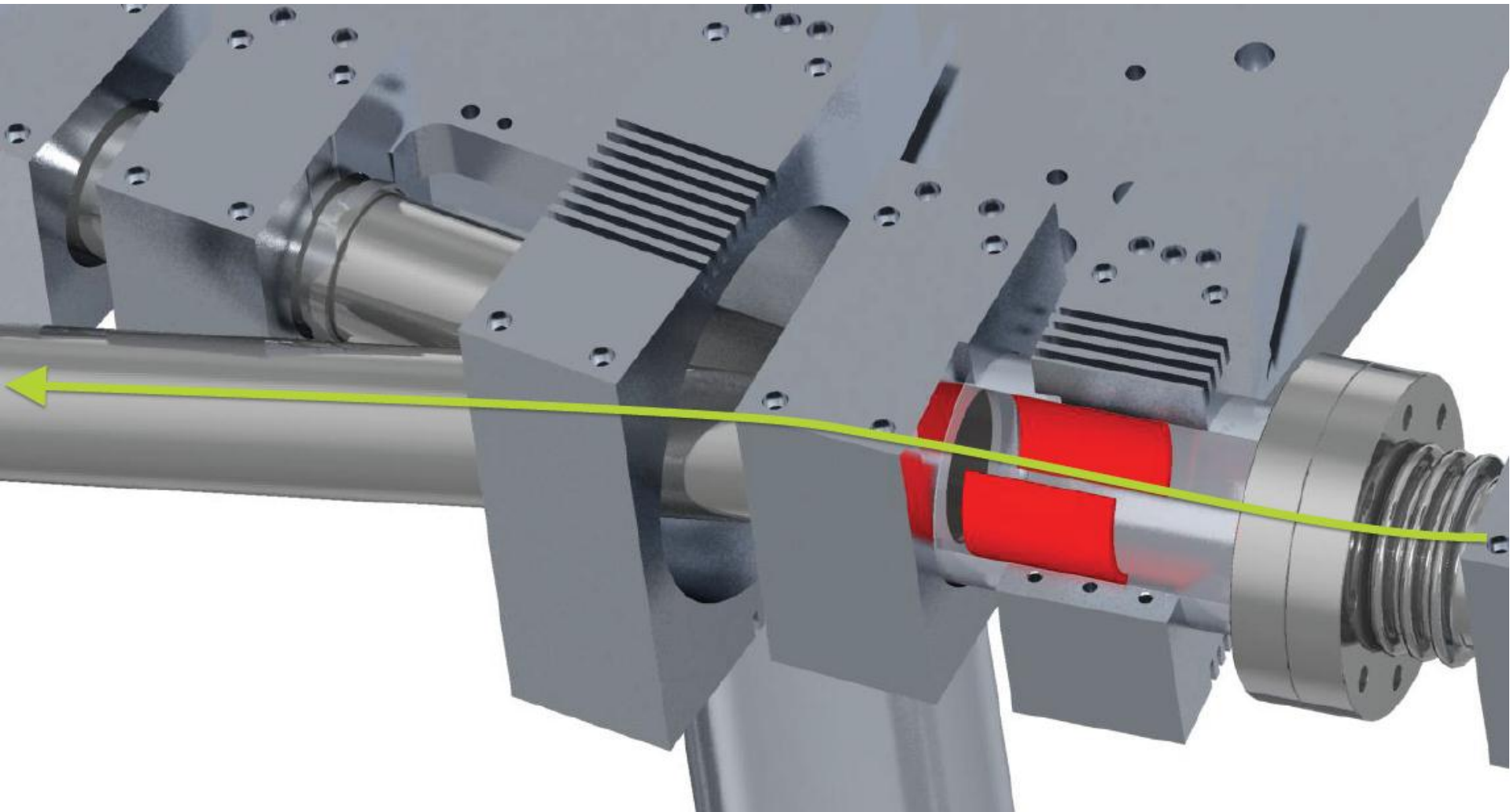




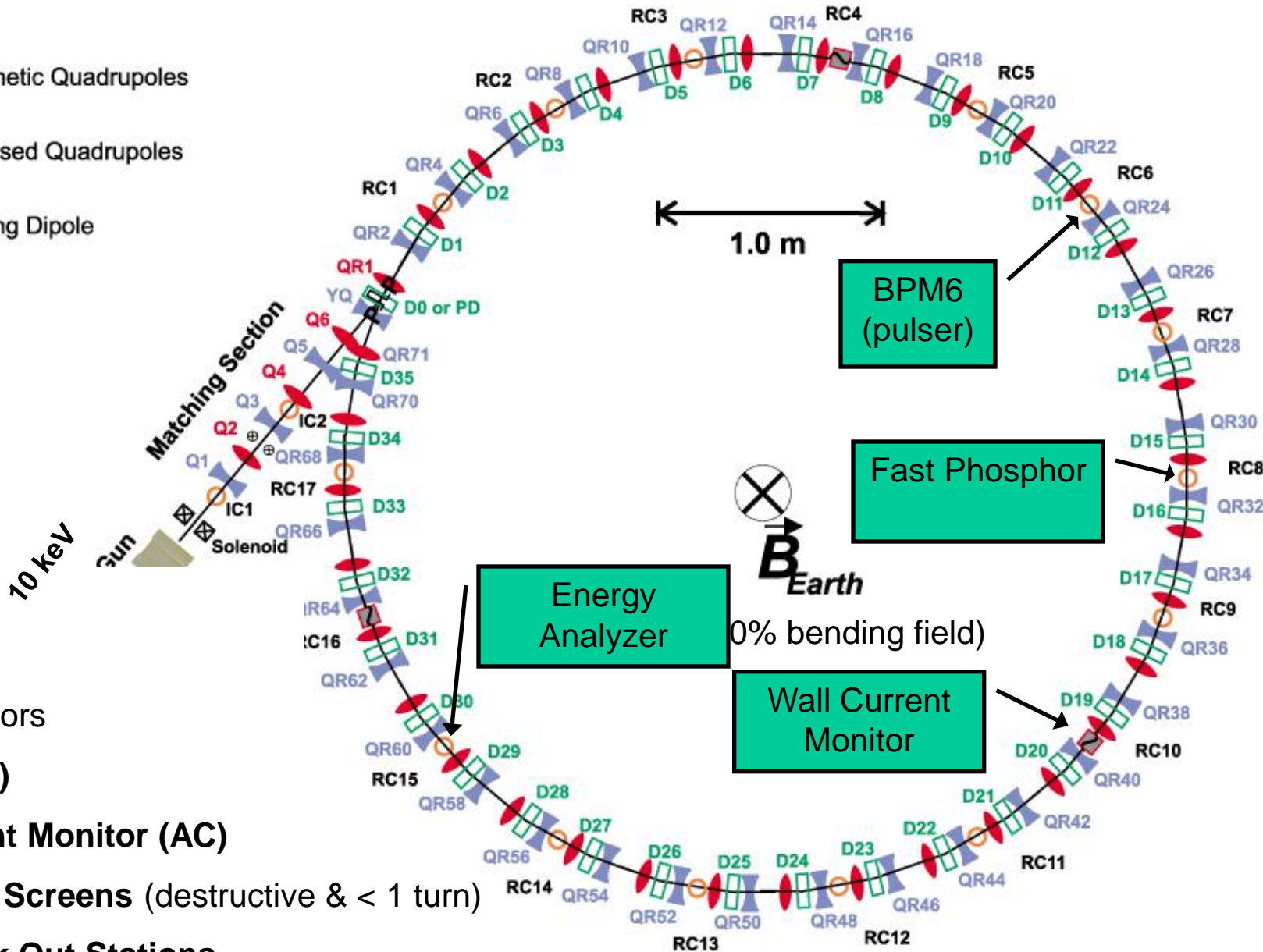


UMIER's Eyes & Ears



UMER OVERVIEW

-  DC Magnetic Quadrupoles
-  Wide Pulsed Quadrupoles
-  DC Bending Dipole
-  Solenoid

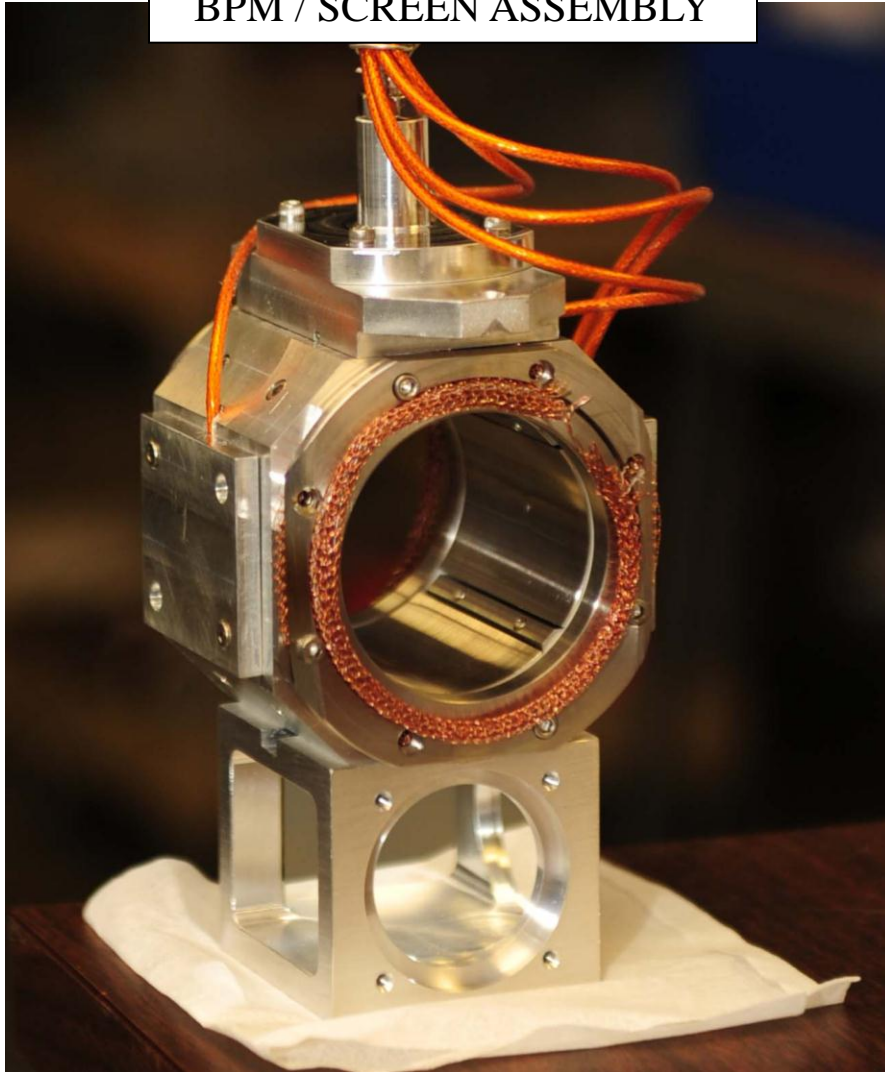


RING

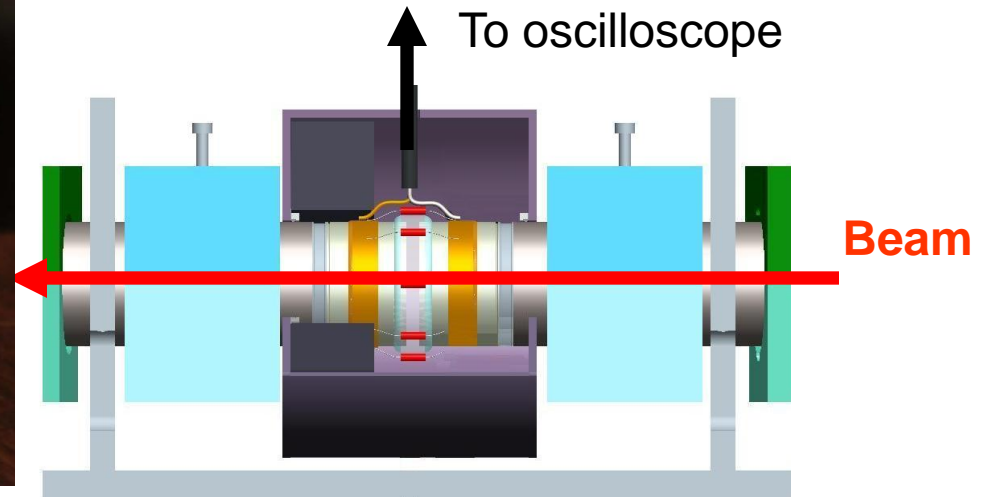
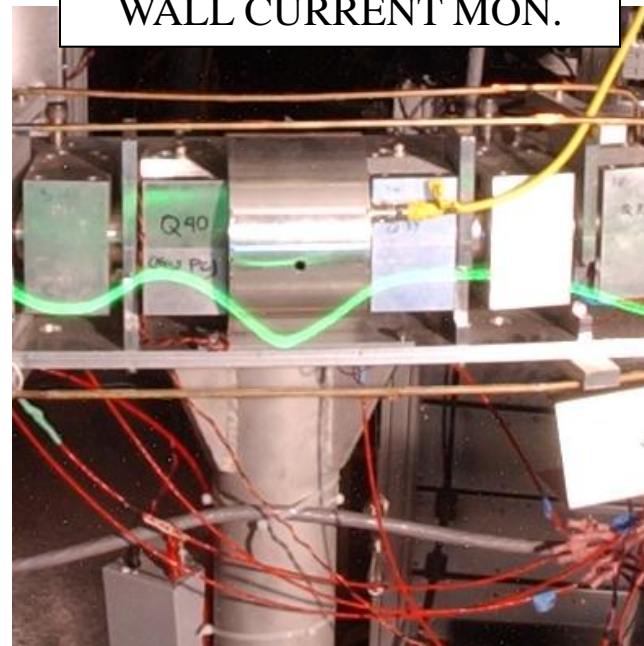
- 72 Quads
- 36 Dipoles
- H & V correctors
- 14 BPMs (AC)
- 1 Wall Current Monitor (AC)
- 14 Phosphor Screens (destructive & < 1 turn)
- 3 Fast Knock Out Stations

BPM, SCREEN & CURRENT MONITOR

BPM / SCREEN ASSEMBLY

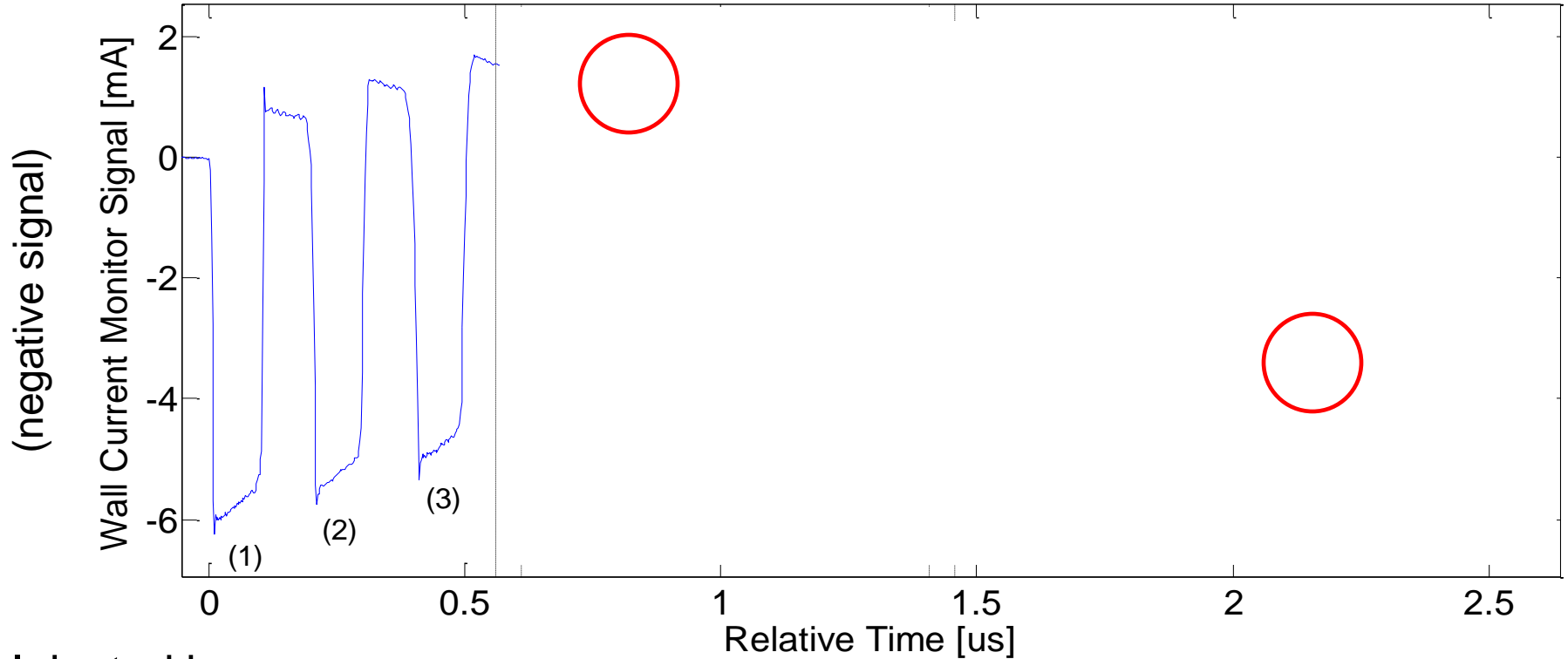


WALL CURRENT MON.



EXAMPLE WALL CURRENT MON.

Truncated turns to discern subtle features



Injected beam:

6 mA_{peak},

100 ns (197 ns revolution time)

~ 50% duty cycle

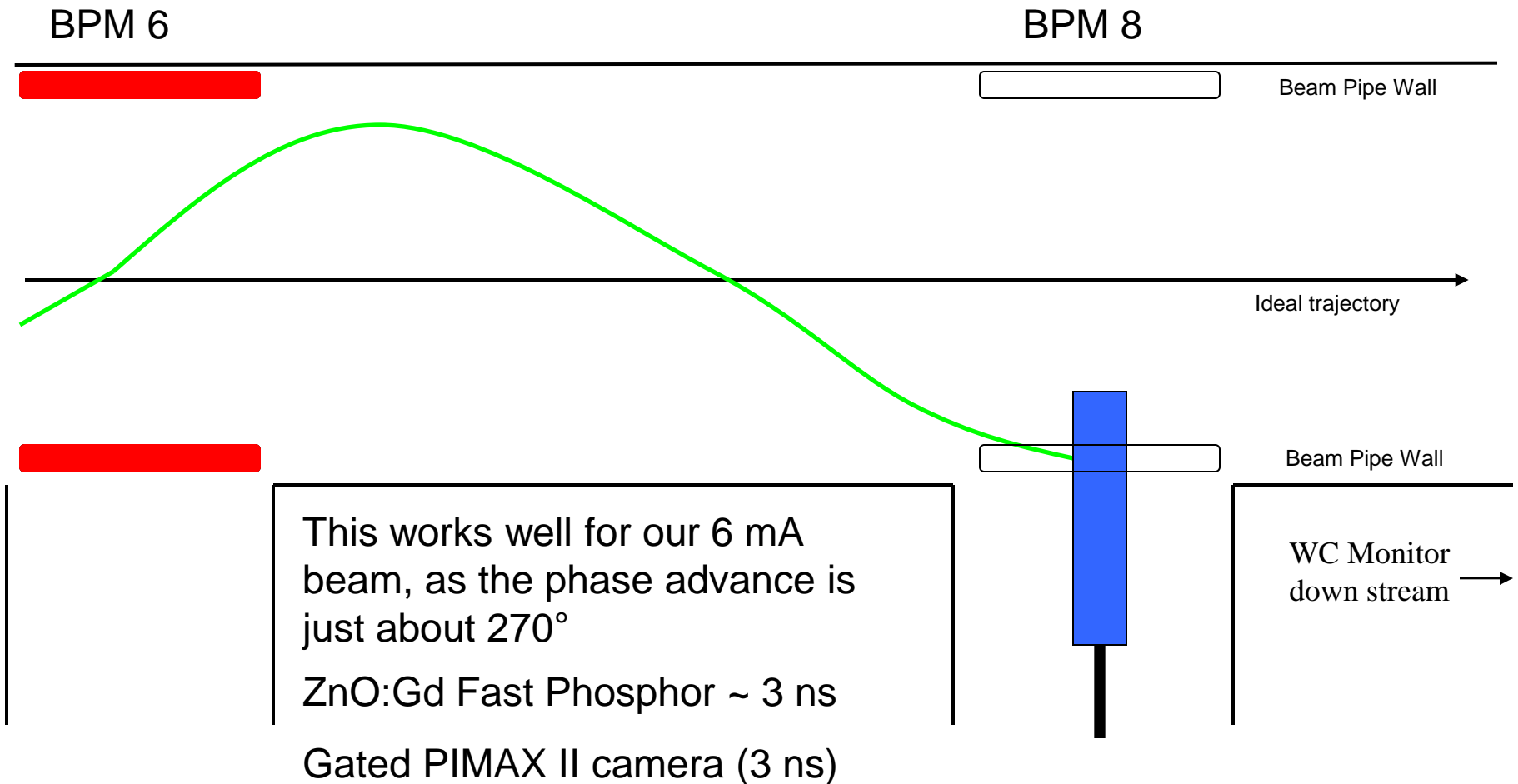
We have to accommodate the AC and transient characteristics of the wall current monitor circuitry.

- DC 'blind'

- Transient response

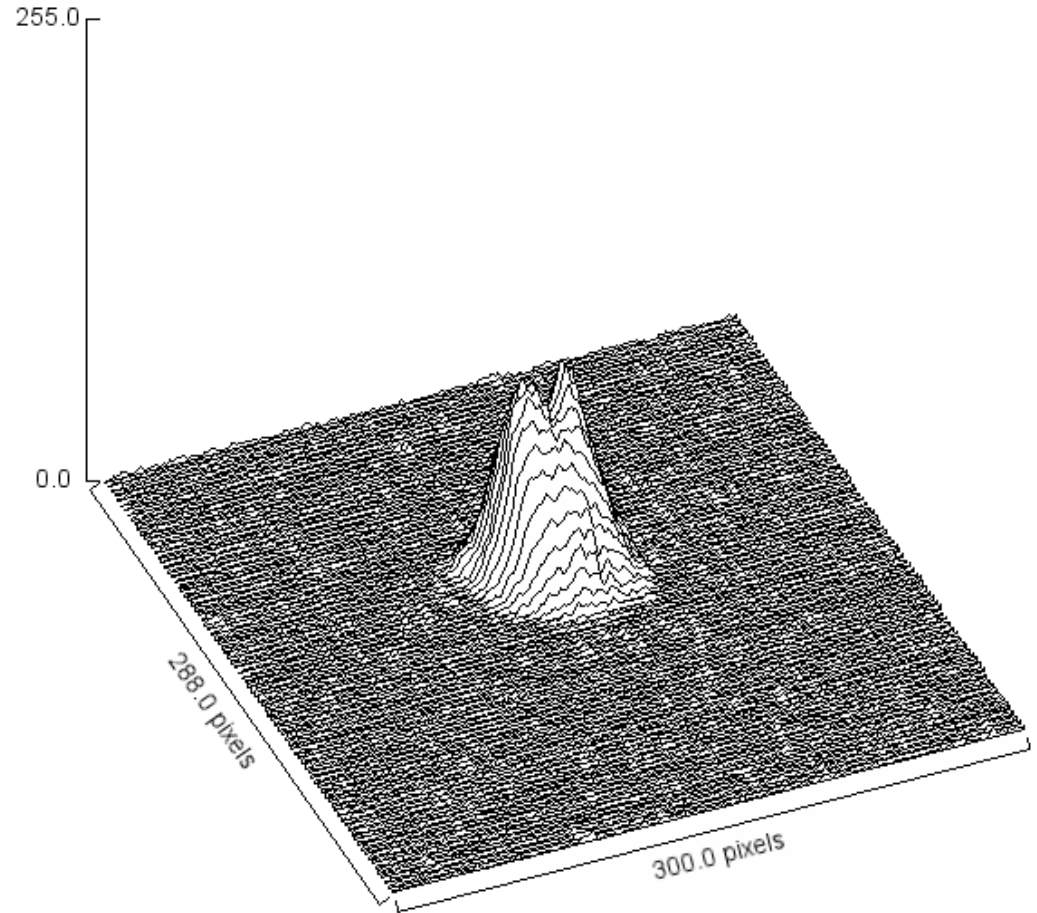
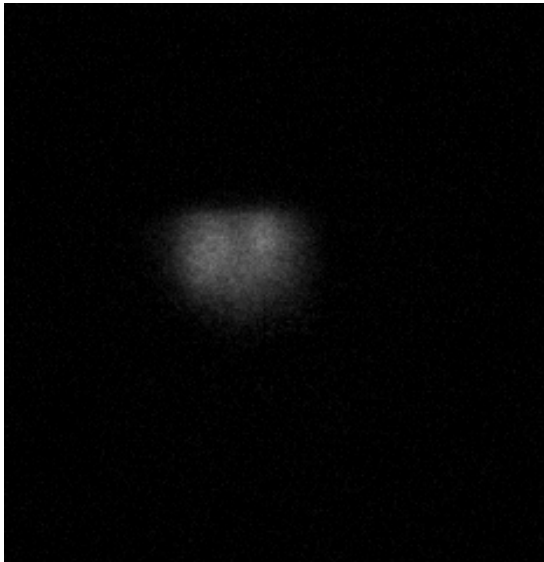
“POOR MANS” EXTRACTION (X3)

DC measurement and transverse imaging



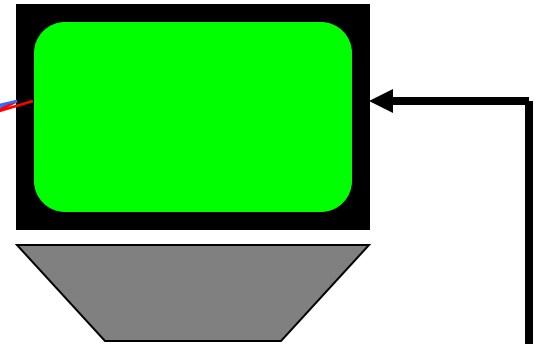
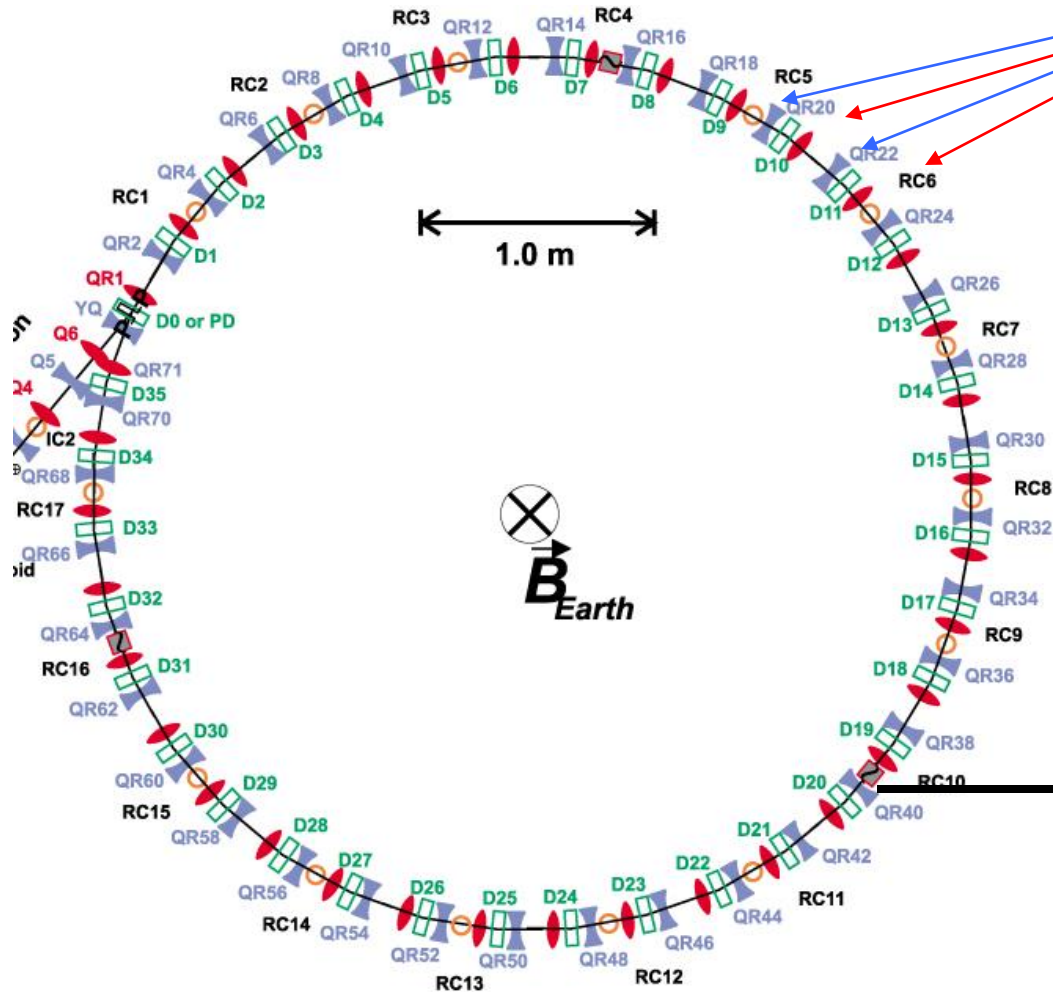
"Longitudinal Relaxation of a Space-Charge Dominated Bunch," Proceedings of the 2011 IEEE Particle Accelerator Conference, New York, NY, 22 (2011).

~ 47th Turn, Two Beamlets Observed



BEAM LIFE TIME (QUAD SCAN)

Automated. Scans ~ 24 hours



Quad Scan

1. Set even quads (D)
2. Set odd quads (F)
3. Measure beam intensity every turn (norm to 1st turn)
4. Repeat at new D,F Quad values

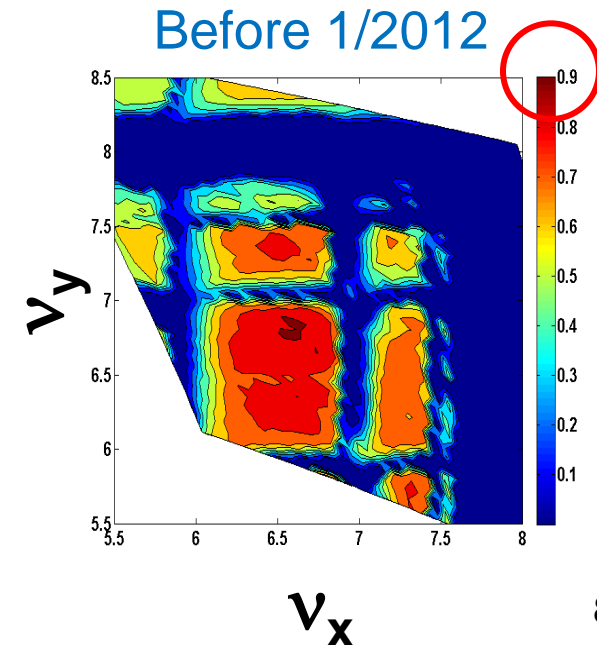
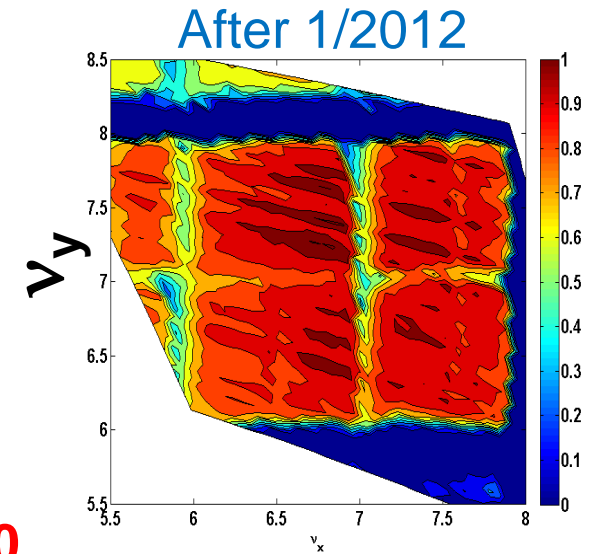
MAPPING OF RESONANCES OVER WIDE RANGE OF TUNES

Work in Progress

Shown: fraction of transmitted current after **10 turns** for each of 2000 operating tunes

6 mA beam: $\chi \sim 0.8$, $\sigma/\sigma_0 \sim 0.45$

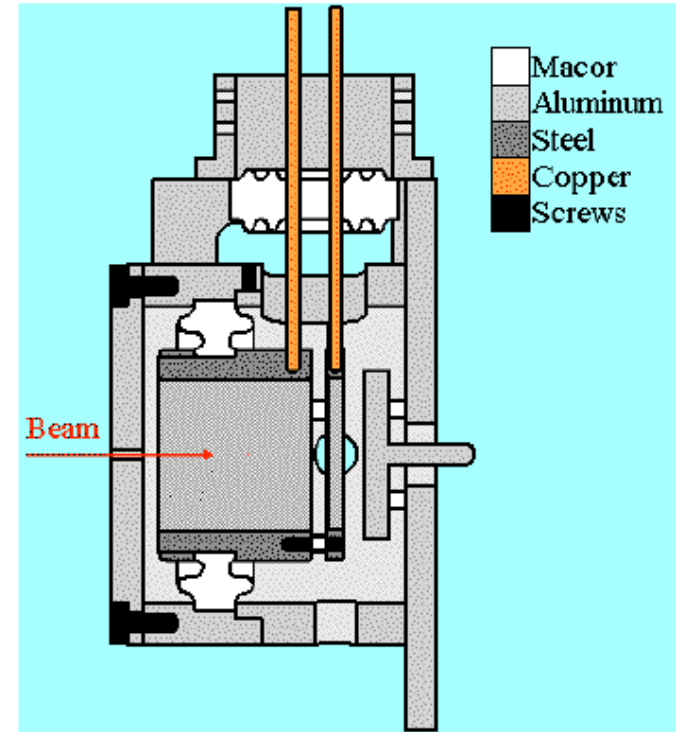
Injected incoherent tune shift from space charge > 3.0



Stop bands narrowed and growth rates reduced after detailed mechanical survey and alignment in 1/2012

Recently Installed an Energy Analyzer

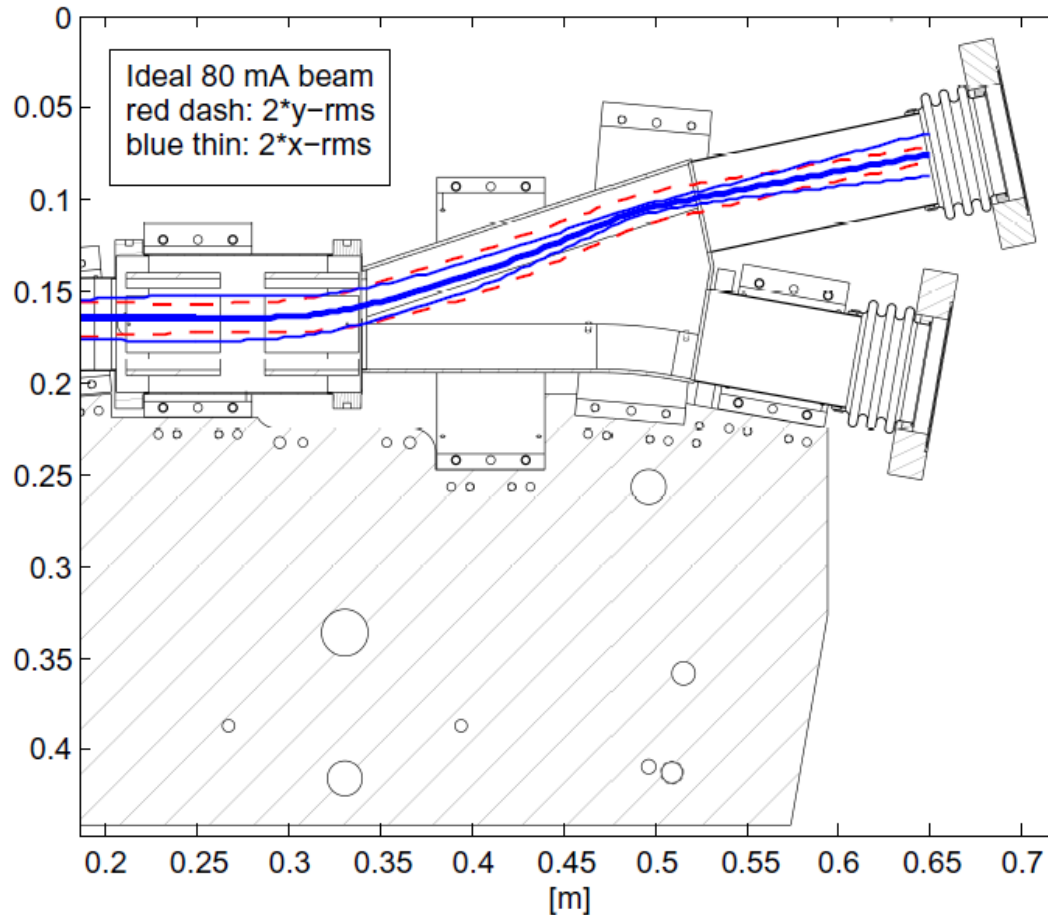
Electrostatic Retarding Grid



Design of a compact, High-Resolution analyzer for longitudinal energy studies in the University of Maryland Electron Ring, E. Voorhies, et al, PAC2011

We are Designing an Extraction Section

Turn-by-turn emittance evolution, E & ΔE measurement, etc



Pulsed HV extraction, as opposed to present pulsed magnetic injection.

END HERE