

BPM's for NuMI

June 25, 2002

- 1) NuMI BPM specifications and schedule
- 2) BPM electronics for NuMI
- 3) Plan to provide BPM electronics for NuMI in 2004

NuMI BPM Specifications

	Transport BPM	Target BPM
Num Channels	21	4
System Type	Single Pass	Single Pass
Beam Bunch Freq	53 MHz	53 MHz
Num Bunches	80 x (1 to 6)	80 x (1 to 6)
Dynamic Range (particles/bunch)	$3e9 - 6e10$	$3e9 - 6e10$
Processing BW	Single batch	Single batch

NuMI BPM Specifications (cont)

	Transport BPM	Target BPM
Position Accuracy (mm) RMS	0.2 @ 1e10 0.3 @ 4.5e9 (over +/- 20 mm)	0.1 @ 1e10 0.15 @ 4.5e9 (over +/- 6 mm)
Stability (mm)	*	*
Resolution (mm)	*	*
Processing Technology	TBD	TBD
Control Interface	TBD	TBD
Cost/Channel	TBD	TBD

* Necessary requirements to provide stable and robust position accuracy for each beam pulse.

NuMI BPMs: Important Considerations

- Must provide robust capability suitable for use with auto-tune trajectory correction
 - Electronics monitoring (control room capability)
 - Intensity monitoring ($\pm 5\%$) plus each batch position
- Significant overlap in beam parameters with Main Injector
- Standardization with other BD systems – long term high quality support is essential

Upgrade Path

- Operation at higher pulse intensity – $8e10$
 - Dependent on accelerator capability
- Improved target BPM accuracy to 0.05 mm for medium or high energy neutrinos
 - Physics driven – not on horizon at this time

BPM Signal Cables

- Presently, using RG-8 for transport BPMs and Heliax for targeting BPMs
- RF&I input needed if desire to change transport cables to Heliax
 - Cables pulled in outfitting contract
 - Need final decision by Sept 1, 2002

NuMI Schedule

- NuMI primary commissioning in 2004
- Shutdown in mid-2004
 - Complete BPM installation and beam ready by end of shutdown
- Plan to have BPM electronics complete, installed and ready for operation by March 2004 (< 90 day float)
- Final decision on BPM direction in Sept 2002
 - Engineering start on Oct 1, 2002
 - Allows 18 months for engineering, purchasing, assembly, testing and installation