Accelerator and Beamline Research and Technology Development for High-Power Neutrino Beams

Continuing collaboration (consortium) on accelerator & beamline R&D in support of high-power neutrino beams.

Principal Investigators:

KEK/J-PARC: Nakadaira

Fermilab: Zwaska, Seiya, Papadimitriou

Colorado: Marino, Zimmerman

Supported at $135k in previous call

[425 hrs + 22k travel + 24k M&S]

Requesting $465k in this call

[1100 hrs + 45k travel + 57k CU + 122k M&S]

Colorado university now treated as subcontractor on Fermilab proposal.

Areas of research interest:

- Gated ionization profile monitor
- Laser manipulation of H- beams
- Beam dynamics studies for beam loss reduction
- Extracted beam monitoring
- High-power target facility issues

Activities from previous proposal started in October:

- Travel between Fermilab & J-PARC of research groups
- Development of hardware for device testing
- Workshops for exchange of knowledge on megawatt-class beams

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Gated ionization profile monitor

IPM is beam instrumentation which measures beam width. Research into gating would allow much longer lifetime in accelerator, and thus greater ability.

Laser manipulation of H- beams

Stripping of beam in linac and at injection. Can make flexible beam patterns and eliminate a dominant losss source. Also explore other options for beam shaping and instrumentation

Beam dynamics studies for beam loss reduction

New approaches to synchrotron lattice optimization and measurements to decrease high-intensity beam loss.

Extracted beam monitoring

Development of technology to allow spill-to-spill beam profile measurements in extraction lines, and allow long lifetime of the devices an minimal radioactivation. Presently work on low-mass multiwire SEMs and OTR foils. Interest in gaseous devices.

High-power target facility issues

High-interest in radiation-resistant materials to seal the gas volumes around the beamlines. Feedthroughs for utilities are a weak point; need to developed sealed and cooled stripline for horn current conductors. Also will develop techniques to gracefully recombine radiolyzed hydrogen and water within the horn water spray volumes