

2023 RaDIATE Collaboration Meeting



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LBNF Nu Upstream Decay Pipe Window Radiation Damage R&D Needs

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The Long Baseline Neutrino Facility (LBNF) Project, currently under final design, will deliver neutrino beam to the Deep Underground Neutrino Experiment (DUNE) utilizing 120 GeV proton beam on a graphite target at 1.2 MW in 2031 and up to 2.4 MW by 2036. The LBNF neutrino beamline utilizes several beam intercepting devices that are being designed and built to withstand the cyclic thermal shock of the pulsed beam and provide thermal management of the absorbed power. Although operating parameters have been chosen to be within the realm of previous operational experience with neutrino targets (primarily NuMI at Fermilab and T2K at J-PARC), radiation damage effects on critical properties of the chosen materials are still not fully understood, especially effects on fatigue and dimensional stability. Due to this, a key area requiring R&D studies is the Upstream Decay Pipe Window which will experience direct beam downstream of the target. This talk will introduce the irradiation conditions of the LBNF Upstream Decay Pipe Window, a discussion on areas of concern within the design and possible R&D paths that can be taken, material properties that must be researched, and a brief discussion on some preliminary thermal and structural analyses that has been conducted.

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