Dealing With Radiation Issues in the FRIB Fragment Separator

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Abstract:

The Facility for Rare Isotope Beams under construction at Michigan State University, a new national user facility funded by the U. S. Department of Energy Office of Science, will provide beams of any element at energies of 200 MeV/u at a power of 400 kW. Rare isotopes are generated by fragmentation or in-flight fission by interactions of the beam with a production target. The reaction in the target produces several kilowatts of fragments as well as neutrons. The unreacted beam in the beam dump also produces a sea of neutrons and other secondary reaction products that are not absorbed by the dump. We will present creative shielding and magnet designs that mitigate the effects of the high radiation on the superconducting magnets and allow operation in a very hostile environment. Magnets with the highest energy deposition rate utilize HTS coils to reduce the cryogenic load and the necessity of using organic insulators. Some of these designs will be presented.

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