

# Workshop on Radiation Effects in Superconducting Magnet Materials 2015 (RESMM'15)

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## Radiation Heat Load and Coil Lifetime Calculations in Support of FRIB Dipole Magnet Design

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### **Content :**

The Facility for Rare Isotope Beams (FRIB) project is under construction at Michigan State University. 400 kW beam operations with heavy ions ranging from oxygen to uranium will create a high radiation environment for many components, particularly superconducting magnets. Therefore, detailed studies of the proposed magnet design and shielding have been done to ensure magnets will survive in that environment and that the cryogenic requirements do not exceed refrigeration capacity.

Using the Monte-Carlo particle transport code PHITS, the radiation heat loads and coil lifetimes of the 30 degree bending dipole located in the fragment preseparator are calculated. Results from radiation transport and beam physics calculations are in reasonable agreement. This comparison validates our approach. Our results show that both the High Temperature Superconductor (HTS) and Low Temperature Superconductor (LTS) technologies are viable for the 30 degree bending dipole, with coil lifetimes compatible with long-term operations.

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