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Micro Penning Trap for Continuous Magnetic Field Monitoring in High Radiation Environments[1] JAVIERA LATORRE, Florida International Univeristy, GEORG BOLLEN, KERIM GULYUZ, RYAN RINGLE, NSCL/FRIB, PHILIPPE BADO, MARK DUGAN, Translume, LEBIT TEAM, TRANSLUME COLLABORATION — As new facilities for rare isotope beams, like FRIB at MSU, are constructed, there is a need for new instrumentation to monitor magnetic fields in beam magnets that can withstand the higher radiation level. Currently NMR probes, the instruments used extensively to monitor magnetic fields, do not have a long lifespans in radiation-high environments. Therefore, a radiation-hard replacement is needed. We propose to use Penning trap mass spectrometry techniques to make high precision magnetic field measurements. Our Penning microtrap will be radiation resistant as all of the vital electronics will be at a safe distance from the radiation. The trap itself is made from materials not subject to radiation damage. Penning trap mass spectrometers can determine the magnetic field by measuring the cyclotron frequency of an ion with a known mass and charge. This principle is used on the Low Energy Beam Ion Trap (LEBIT) minitrap at NSCL which is the foundation for the microtrap. We have partnered with Translume, who specialize in glass microfabrication, to develop a microtrap in fused-silica glass. A microtrap is finished and ready for testing at NSCL with all of the electronic and hardware components setup.

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