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Micro Penning Trap for Continuous Magnetic Field Monitoring in High Radiation Environments[1] JAVIERA LATORRE, Florida Intentional Univeristy, GEORG BOLLEN, KERIM GULYUZ, RYAN RINGLE, NSCL/FRIB, PHILIPPE BADO, MARK DUGAN, Translume, LEBIT TEAM, TRANSULME COLLABORATION — With new, high-power, facilities for rare isotope beams, like FRIB at MSU being built, there is a need for new instrumentation for monitoring the magnetic field in beam line magnets that can withstand high levels of radiation. Currently NMR probes, the instrument used extensively to monitor magnetic fields, do not have a sufficiently long lifespan in high-radiation environments. Therefore, a radiation-hard replacement is needed. We propose to use Penning trap mass spectrometry techniques in order to measure magnetic fields with high precision. Our Penning microtrap will be radiation resistant as all of the vital electronics will be at a safe distance and the trap itself will suffer very little degradation as the materials it is constructed from are not subject to radiation damage. Penning trap mass spectrometers can determine the magnetic field through a measurement of 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, to develop a microtrap in fused-silica glass. A prototype microtrap has been installed in a test station at NSCL, and commissioning has begun.

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