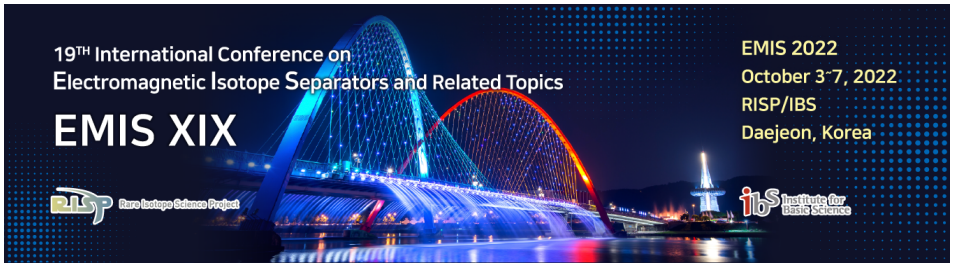

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Progress towards the EDM3 instrument at FRIB: A tool for studying radioactive molecules embedded inside cryogenic solids

Friday, 7 October 2022 09:20 (20 minutes)

The Facility for Rare Isotope Beams (FRIB) at Michigan State University has recently commenced operation and delivered first radioactive ion beams to its users [1, 2]. Besides its portfolio of fast, stopped, and re-accelerated beams, isotope-harvesting techniques are being developed to exploit isotopes that are otherwise lost to the beam dump [3]. The study of radioactive molecules receives increasing attention due to their enhanced sensitivity to fundamental symmetry violations and Beyond Standard Model physics [4].

In this contribution, we introduce the FRIB-EDM3-instrument which is currently under construction. The setup was designed to study polar radioactive molecules (like RaF) in transparent cryogenic solids by laser spectroscopy with the EDM3-method [5]. The efficient ionization of harvested radioisotopes from aqueous phase is pursued with a spray-ionization method [6]. Subsequently, the molecular ion beam is analyzed by mass-to-charge ratio by a quadrupole mass filter and neutralized in a charge-exchange cell before its implantation in a solid argon matrix. We will present the design of the instrument and report on the progress of its construction.

References

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