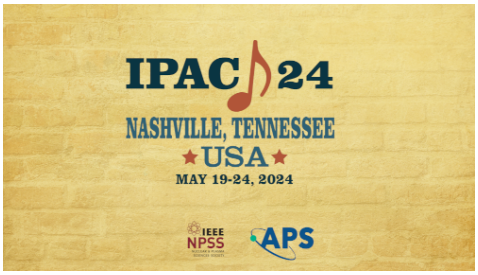

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DEVELOPMENT OF INDUCTIVE HIGH TEMPERATURE OVEN (HTO) AT THE FACILITY FOR RARE ISOTOPE BEAMS (FRIB)

Monday, 20 May 2024 16:00 (2 hours)

Many of ion beams generated by the Electron Cyclotron Resonance Ion Source (ECRIS) originate from solid-state materials and undergo a conversion process to transition from a solid to a gaseous state before being introduced into the plasma. Established techniques for thermal evaporation encompass ovens and others. The primary objective is to advance oven technology targeting increased reliability, durability, efficiency, and an expanded temperature range. At the Facility for Rare Isotope Beams (FRIB), a specialized inductive High Temperature Oven (HTO) has been developed to ensure the consistent and reliable production of metallic ion beams. ANSYS simulations have been carried out to maximize the temperature inside the oven and to help select the materials used with the oven based on the analysis on the heat distribution. Off-line tests have shown that the oven operates durably at temperatures close to 2000℃, and on-line tests already demonstrated beam intensity as high as 52 eμA of 238U35+ and 60 eμA of 238U33+. This paper presents and discusses the design features, ANSYS simulations, off-line and on-line test results of the HTO.

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