

Abstract Submitted  
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**Development of a Negative Ion Beam Apparatus**<sup>1</sup> C.M. JANCZAK, K.A. STARR, D.A. RICHARDSON, C.H. MOSIER, C.W. WALTER, N.D. GIBSON, Denison University, P. ANDERSSON, Gothenburg University, Sweden — Primary design and construction tasks have been completed for a new negative ion beam apparatus for laser photodetachment experiments. A cesium sputtered negative ion source produces 10-20 keV ions which are formed into a beam and mass selected. Projects included installation of a new ultrahigh vacuum chamber, tuning of a 90° mass separating magnet and associated beam optics, and construction of a photon-ion interaction region with neutral particle separation and detection. Working pressures of  $1.0 \times 10^{-9}$  torr have been achieved in the analysis chamber, and successful detection of photodetached neutrals from multiple ion species has been demonstrated. Isotopic identification of  $\text{Pt}^-$  has been used to determine the mass resolution to be  $\sim 1$  in 330 amu. Use of a limited sputter angle  $\text{CeO}_2$  cathode in the source permitted production of  $^{140}\text{Ce}^-$  beams of  $\sim 70$  pA with a cathode life up to 76 hours without deterioration of ion source performance.

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