

Abstract Submitted  
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**Parametrics for Molecular Deuterium Concentrations in the Source Region of the UW-IEC Device Using an Ion Acoustic Wave Diagnostic** D.R. BORIS, G.A. EMMERT, Fusion Technology Institute-University of Wisconsin-Madison —

The ion source region of the UW-Inertial Electrostatic Confinement device is comprised of a filament assisted DC discharge plasma that exists between the wall of the IEC vacuum chamber and the grounded spherical steel grid that makes up the anode of the IEC device. A 0-dimensional rate equation calculation of the molecular deuterium ion species concentration has been applied utilizing varying primary electron energy, and neutral gas pressure. By propagating ion acoustic waves in the source region of the IEC device the concentrations of molecular deuterium ion species have been determined for these varying plasma conditions, and high  $D_3^+$  concentrations have been verified. This was done by utilizing the multi-species ion acoustic wave dispersion relation, which relates the phase speed of the multi-species ion acoustic wave,  $v_{ph}$ , to the sum in quadrature of the concentration weighted ion acoustic sound speeds of the individual ion species.

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