

Abstract Submitted  
for the DPP17 Meeting of  
The American Physical Society

**DD fusion neutron production at UW-Madison using IEC devices**<sup>1</sup> AARON FANCHER, MATT MICHALAK, GERALD KULCINSKI, JOHN SANTARIUS, RICHARD BONOMO, University of Wisconsin-Madison — An inertial electrostatic confinement (IEC) device using spherical, gridded electrodes at high voltage accelerates deuterium ions, allowing for neutrons to be produced within the device from DD fusion reactions. The effects of the device cathode voltage (30-170 kV), current (30-100 mA), and pressure (0.15-1.25 mTorr) on the neutron production rate have been measured. New high voltage capabilities have resulted in the achievement of a steady state neutron production rate of  $3.3 \times 10^8$  n/s at 175 kV, 100 mA, and 1.0 mTorr of deuterium. Applications of IEC devices include the production of DD neutrons to detect chemical explosives and special nuclear materials using active interrogation methods.

<sup>1</sup>Research supported by US Dept. of Homeland Security grant 2015-DN-077-AR1095 and the Grainger Foundation.

Aaron Fancher  
University of Wisconsin-Madison

Date submitted: 14 Jul 2017

Electronic form version 1.4