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Measurement of ^{3}He(^{3}He,2p)^{4}He Reactions in an IEC Device[1]

GREGORY R. PIEFER, GILBERT A. EMMERT, JOHN F. SANTARIUS, Univ. of Wisconsin — An inertial electrostatic confinement (IEC) device has been used to measure ^{3}He(^{3}He,2p)^{4}He reactions. The experimental setup consists of a spherical vacuum vessel approximately 61 cm in diameter held at ground potential and a spherical cathode centered within the vessel that can be biased from 0 to -200kV. The ion source is an externally mounted high-density helicon source which provides a beam of up to $\sim 6*10^{16}$ ions/s. This source allows for IEC operation to occur at ^{3}He background pressures of < 0.02 Pa, reducing atomic effects and allowing for more straightforward code validation. An integral equation approach models atomic physics processes and nuclear reactions in order to predict the energy spectrum of the ^{3}He ions(details in poster by Emmert and Santarius, this conference). The integral equation is solved numerically by finite differences. The ^{3}He(^{3}He,2p)^{4}He fusion reaction rates measured experimentally will be compared to those generated by the computer code.

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