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Studies of Negative Ion Generation in an Inertial Electrostatic Confinement Fusion Device[1] ERIC ALDERSON, JOHN SANTARIUS, GIL EMMERT, DAVID DONOVAN, GERALD KULCINSKI, Univ. Wisconsin Madison — The discovery of negative ion generation in Inertial Electrostatic Confinement (IEC) devices [1] has prompted a campaign to extend understanding of negative ion phenomena in IEC devices. Theoretical studies include modeling negative ion physics in IEC devices by adding negative ion generation and propagation to a 1-D computational model of ion and fast neutral currents in IEC devices [2], to produce negative ion spectra that can be compared with experiment. Experimental studies of negative ions in an IEC device focus on examining negative ion current spatial profiles, generated by a mobile Faraday Cup in the IEC device source region. This study explores the relationship between negative ion production and cathode geometry, and looks for evidence of negative ion focusing. The improved understanding of IEC physics from this work will be presented and the viability of the IEC as a negative ion source will be evaluated.

[1] D.R. Boris, et al., Phys. Rev. E. 80, 036408 (2009).
[2] G.A. Emmert and J.F. Santarius, Phys. Plasmas 17, 013503 (2010).

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