Abstract Submitted
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Integral Transport Analysis of Ions Flowing Through Neutral Gas[1] GILBERT EMMERT, JOHN SANTARIUS, ERIC ALDERSON, University of Wisconsin — A computational model for the flow of energetic ions through a background neutral gas is being developed. Its essence is to consider reactions as creating a new source of ions or neutrals if the energy or charge state of the resulting particle is changed. For a given source boundary condition, the creation and annihilation of the various species is formulated as a 1-D Volterra integral equation[1] that can quickly be solved numerically by finite differences. The current work focuses on radially converging, multiple-pass, 1-D ion flow through neutral gas and a nearly transparent, concentric anode and cathode pair in spherical geometry. This has been implemented as a computer code for atomic (3He, 3He+) and molecular (D, D2, D-, D+, D2+, D3+) ion and neutral species, and applied to modeling inertial-electrostatic confinement (IEC) devices. The inclusion of negative ions is a recent development[2]. The code yields detailed energy spectra of the various ions and energetic neutral species. Comparisons with experimental data for a University of Wisconsin IEC device will be presented.

[1] G.A. Emmert and J.F. Santarius, Phys. Plasmas 17, 013502 [atomic] & 13503 [molecular] (2010).
[2] E.C. Alderson, et al., this conference.

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