

Abstract Submitted
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Collisional Effects in Simulations of High Altitude Nuclear Explosions TANIM ISLAM, Lawrence Livermore National Laboratory — The simulation of the later-time (> 1 second) debris dynamics of a high altitude nuclear explosion (HANE) require, at a minimum, an understanding of the interaction of the ionized blast material with the relatively collisional upper ionosphere and lower exosphere (≤ 200 km). At these altitudes, the collisional mean free path of ionized atmospheric particles may become smaller than the length scale of the diamagnetic bubble. Here we report on the local dynamics about the debris/air interface for Starfish Prime [1] like, and lower energy, HANEs at altitudes in which collisionality becomes important. We model the debris dynamics with the hybrid plasma simulation code KIM3D [2], and use a standard Miller-Combi particle pairing algorithm [3] to model particle collisions. We demonstrate new dynamics associated with finite collisionality in mildly collisional HANEs.

[1] P. Dyal, *Journal of Geophysical Research* **111**, A12211 (2006).

[2] S.H. Brecht, in *Space Plasma Simulation*, edited by J. Büchner, C. T. Dum, and M. Scholer (2001), p. 70.

[3] R. H. Miller and M. R. Combi, *Geophysical Research Letters* **21**, 1735 (1994).

Tanim Islam
Lawrence Livermore National Laboratory

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