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Kinetic Modeling of Collisional Shocks Using OSIRIS¹ JOSH MAY, UCLA, RUI HUA, MATHIEU BAILLY-GRANDVAUX, FARHAT BEG, UC San Diego, WARREN B MORI, UCLA — Using the particle-in-cell code OSIRIS along with a binary Coulomb collision scheme, we study shock experiments which were performed on OMEGA-EP. In the experiments, shocks are formed by an ablator-driven SiO₂ piston entering mixtures of noble gasses at standard temperature and pressure. The shocks can be observed after $3ns$ traveling at velocities of roughly $0.002c$. OSIRIS results indicate, first, that these shocks are collision mediated, as ion-electron temperature equalization (also collision driven) happens too rapidly for an ion-acoustic shock to be sustained. Second, they indicate that the plasma remains kinetic throughout the shock-formation process, and in particular that a fluid shock front cannot form in this rapidly with a uniform piston velocity; however using an accelerating piston or plasma can give consistent results.

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