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Study of Current Sheet Formation and Forced Reconnection Based on the Newton Challenge. JOSHUA KING, UC Berkeley, GIOVANNI LAPENTA, Los Alamos National Laboratory — Through the rapid acceleration of a boundary, or supersonic injection, it is possible to generate a shock wave within a plasma. It was the intention of this work to simulate shocks in both a fluid and a kinetic model of a plasma. The particular codes used were Graale, in the fluid case, and CELESTA3D for the kinetic case. It was necessary to verify the validity of the codes first. This was achieved by setting the B-field of Graale to zero, and consequently reducing this plasma code into a gas dynamic code. From here the code was compared against Rankine-Hugonoit jump conditions, and it was found that there was agreement to within 3.6%. Once the fluid case was confirmed accurate, the kinetic case was compared with the fluid case, by comparing the point at which the shocks initially collide. So long as the fluid and kinetic model shocks collide at the same point in time and space, then the shocks speeds are identical and one can presume that the kinetic code is accurate. A noteworthy finding, was the kinetic simulation showed a bifurcated current profile, where as the fluid case did not.

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