

Abstract Submitted
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Plasma collision in a gas atmosphere SEBASTIEN LE PAPE, Laboratoire pour l'Utilisation des Lasers Intenses, LAURENT DIVOL, LLNL, GAEL HUSER, CEA, JOE KATZ, LLE, ANDREAS KEMP, J. S. ROSS, S. WALLACE, S. WILKS, LLNL — Plasma collisions are present in a large range of conditions which impact the characteristics of the collision. We present a study on the impact of a gas atmosphere on the collision of two counter propagating plasmas (gold and carbon). Imaging optical Thomson scattering data of the plasma collision with and without helium in between have been obtained on the Omega laser facility. We observed the presence of gold ions across the entire field of view in the vacuum case. Once Helium is added, the two plasmas remain separated. The dramatic difference in ionic temperature is consistent with a reduction of the maximum flow velocity from $M=7$ to $M=4$ due to the presence of helium. This reduction of a factor 1.75 in peak velocity implies a reduction by a factor of ~ 10 of the mean free path of gold ions into ablated carbon. The presence a small amount of helium is enough to transition from an interpenetrating regime to a regime in better agreement with a hydrodynamic description of the system.

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