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Shock formation in a flowing plasma interacting with crossed laser beams WOJCIECH ROZMUS, J. LUDWIG, University of Alberta, H.A. ROSE, Retired, T. CHAPMAN, W.A. FARMER, M. BELYAEV, R.L. BERGER, Lawrence Livermore National Laboratory, C. BRUULSEMA, J. MYATT, University of Alberta, P. MICHEL, Lawrence Livermore National Laboratory — High power lasers interacting with flowing plasmas can produce a plasma response that leads to beam bending and, by momentum conservation, to slowing down of the plasma flow velocity [1]. In the vicinity of the sonic flow, where this plasma response is the strongest, the flows interaction with the laser light can lead to shock formation. We report on numerical and analytical studies of shock formation in the geometry relevant to hohlraum experiments and the interaction of plasma flow with the crossing NIF beams in the vicinity of the laser entrance hole. It was demonstrated [2] that beat waves created by crossing pairs of quads on NIF result in a broad spectrum of low frequency fluctuations that accelerate and heat ions. When the momentum transfer to fast moving ions is in the opposite direction to the plasma flow it can slow down the flow and enhance shock formation. The two scenarios of shock formation are examined in the context of NIF experiment and discussed for the relevant parameters. [1] H.A. Rose, Phys. Plasmas 3, 1709 (1996). [2] P. Michel, W. Rozmus, E.A. Williams, et al. Phys. Plasmas 20, 056308 (2013).

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