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Experiments on OMEGA EP to study the material dependence of the two-plasmon decay instability¹ J.R. FEIN, P.A. KEITER, D.H. FROULA, University of Michigan, D.H. EDGELL, University of Rochester, Laboratory of Laser Energetics, P.X. BELANCOURT, J.P. HOLLOWAY, R.P. DRAKE, University of Michigan — For long-scale-length plasmas, two-plasmon decay (TPD) is a major LPI responsible for generating hot electrons (>10 keV). Hot electrons can present unintended effects, such as preheating the target and producing hard x-ray background that can interfere with diagnostics. Understanding hot electron production in laser-produced plasmas is important to control and mitigate these effects. TPD growth is limited by plasma collisionality hydrodynamics, which depend on plasma material Z. It has been predicted and demonstrated by preliminary experiments that hot electron production can be mitigated through varying these parameters, by increasing plasma Z [1,2]. We have performed experiments on OMEGA EP to thoroughly study the Z-dependence of the TPD instability, through varying the material with which the lasers interact. Hard x-ray diagnostics were used to measure hot electron production and optical diagnostics were used to measure the plasma density profile for each material. Preliminary results will be presented, showing how hot electron production and electron density scale lengths scale with Z.

[1] D. T. Michel, *Physical Review Letters*, 109(15), 155007 (2012).

[2] S. X. Hu, et al. *Physics of Plasmas*, 20(3), 032704 (2013).

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