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Thomson Scattering Detection of Ponderomotively Driven KEEN Waves in a Laser Produced Plasma J.L. KLINE, B.B. AFEYAN, W.A. BERTSCHE, R.P. JOHNSON, N.A. KURNIT, D.S. MONTGOMERY, V. SAVCHENKO, K. WON, C. NIEMANN — Kinetic simulations using ponderomotively driven excitations have discovered the existence of stable, nonlinear, multimode coherent structures in plasmas named Kinetic Electrostatic Electron Nonlinear (KEEN) waves.[1] For a given wave number drive, they form and persist for drive frequencies in a broad range of (ω,k) space lower in frequency that electron plasma waves and much higher than ion acoustic waves. Experiments were conducted on TRIDENT by Polymath Research Inc., in collaboration with LANL, to detect these waves driven by the beating of two laser beams. The two lasers used had 527 and 600 nm wavelengths which is predicted to drive waves in the proper KEEN wave excitation band.[1] A nitrogen gas Raman cell was used to convert a 527 nm laser beam to 600 nm. We drove KEEN waves and detected them with 263 and 351 nm Thomson scattering in nitrogen/hydrogen and helium gas jet plasmas. This presentation will cover experimental conditions and diagnostic attributes associated with the detection of KEEN waves. We will discuss the properties of KEEN waves as a function of probe beam intensity and as a function of pump-probe overlap time. Supported by DOE Academic Alliance Grant DE-FG03-03NA00059 and LANL under Contract No. W-7405-ENG-36. [1] B. Afeyan et al., Proc. IFSA (2003, Monterey, CA), 213, Amer Nucl Soc, 2004.

John Kline

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