Abstract Submitted
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Dynamics of a laser-induced relativistic electron beam inside a solid dielectric[1] G.S. SARKISOV, Ktech Corp, V.V. IVANOV, Y. SENTOKU, K. YATES, P. LEBLANC, P. WIEWIOR, J. KINDEL, UNR, V.YU. BYCHENKOV, Lebedev Physics Institute, Russia, D. JOBE, R. SPIELMAN, Ktech Corp — Two-frame interferometry and shadowgraphy were used to investigate the dynamics of interaction of a powerful laser (UNR Leopard 2x10^{18} W/cm^2, 0.5ps, 1057nm) with a glass target. The two-frame laser diagnostic reveals an ionization wave propagating inside the glass with half the speed of light. The interferometry delineates regions of ionization and excitation inside the glass target. A "fountain effect" of fast electrons inside the solid dielectric has been observed for the first time: a radially compact electron beam with sub-light speed fans out from the axis of the original beam, heading back to the target surface. Comparison with French ($\sim 10^{19}$W/cm^2) and UK ($\sim 10^{17}$W/cm^2) experiments implies a logarithmic dependence of the ionization depth with the laser intensity. Relativistic electron beam dynamics stemming from intense laser-glass interaction is a critical concern for the NIF "fast ignition" concept.

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