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Experimental Results and Numerical Predictions of Coherent Transition Radiation (CTR) for the Characterization of High-Current, Fast-Electron Beams M. STORM, J.F. MYATT, A.A. SOLODOV, Laboratory for Laser Energetics, U. of Rochester — CTR imaging is a technique for analyzing the properties of high-current, relativistic electron beams created in laser–solid interactions. Al, Cu, Sn, and Au foils of thickness ranging from 5 to 100 μm were irradiated with an intensity of $\sim 10^{19}$ W/cm^2. Based on the measured signal, the fast-electron-beam temperature (T_{hot}) and divergence were estimated to be $\sim$1.4 MeV and $\sim 10.8^\circ$. Collisional effects were found to influence the estimate of T_{hot} and are quantified using a Monte Carlo code. High-resolution, $\sim$1.4-μm imaging of the rear-surface emission reveals small-scale structures $\sim$2 μm in size, embedded in a larger ring-like structure, suggesting electron-beam filamentation and annular propagation. The interpretation of the experimental observations requires numerical calculations. Using the particle-in-cell (PIC) code *OSIRIS* and the hybrid PIC *LSP*, the distribution of CTR has been simulated. This work was supported by the U.S. Department of Energy Office of Inertial Confinement Fusion under Cooperative Agreement No. DE-FC52-08NA28302.

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