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An Investigation of Photoinjector-Generated Electron Beams for High-Energy-Density and Inertial Confinement Fusion Diagnostics[1] GERRIT BRUHAUG, HANS G. RINDERKNECHT, MINGSHENG S. WEI, GILBERT W. COLLINS, J. RYAN RYGG, JESSICA L. SHAW, Laboratory for Laser Energetics — Modern photoinjector electron sources can now regularly generate high-luminosity, low_bandwidth relativistic electron beams with tens of femtosecond pulse lengths. Electron beams provide a unique diagnostic source because of their high elastic scattering cross section and ease of detection. Relativistic electron beams can also provide extra diagnostic capability in the form of electron radiography and bright broadband or monoenergetic x-ray generation via bremsstrahlung or Compton processes. Pairing an electron beam with the OMEGA EP laser would allow for a tunable source of nearly monoenergetic x rays in the 4- to 60-keV range using Compton scattering. This talk will detail an investigation into the utility of modern relativistic electron-beam sources for diagnosis of laser-driven high-energy-density (HED) and inertial confinement fusion experiments with subpicosecond time resolution. A focus is given towards relativistic electron diffraction diagnosis of HED physics targets and inverse Compton scattering x_ray sources.

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