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Thomson Scattering on exploding wires at 800 kA[1] JOHN GREENLY, CHARLES SEYLER, JACOB BANASEK, WILLIAM POTTER, Cornell University — Laser Thomson scattering measurements have been carried out on a single 0.25 mm diameter Al wire load driven with an 800 kA, 100 ns risetime pulse on the COBRA pulsed power facility. The 527 nm, 10 J, 5 ns laser is brought to a line focus on a chord across the unstable, roughly cylindrical plasma column of the wire, which reaches 8mm outer diameter at 100 ns. The laser path is either on axis or 2mm or 4mm off axis. Scattered signals are collected on a fiber array yielding data across the laser path through the plasma. The scattered light is easily visible over the wire plasma self-emission. The scattered spectra have highly complex structures comprised of as many as four distinct spectral peaks spread over ˜1 nm in wavelength, both red-and blue-shifted. On axis, the laser does not reach the far side of the plasma, being totally absorbed and/or refracted out of its path. 2 mm off-axis the beam is severely refracted, probably from near the critical surface in the plasma, appearing in images taken with cameras ˜45 degrees off its entering path. The scattering should be in the collective regime, and analysis is underway to extract information on flow velocities and temperatures within the volume, of 0.5mm radius, imaged by each fiber.

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