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Measurement Of Magnetic Fields In Magnetized Plasmas Using Zeeman Broadening Diagnostics[1] SHOWERA HAQUE, MATTHEW S. WALLACE, PAUL NEILL, Univ of Nevada - Reno, RADU PRESURA, Voss Scientific, LLC — The Zeeman effect has been used to measure the magnetic field in high energy density plasmas. The measurements are difficult in this regime because the line broadening due to the high plasma density and temperature surpasses the Zeeman splitting. Using an idea proposed by Tessarin *et al.* (2011), we have measured the field in magnetized laser plasmas and the magnetized precursor of wire array z-pinches. Time-gated spectra with one-dimensional space-resolution were obtained at the Nevada Terawatt Facility for laser plasmas created by 20 J, 1 ns Leopard laser pulses, and expanding in the azimuthal magnetic field produced by the 0.6 MA Zebra pulsed power generator, and for wire array plasmas driven by the 1 MA configuration of the Zebra generator. We explore the response of the Al III 4s $^2S_{1/2}$- 4p $^2P_{1/2,3/2}$ doublet components and the C IV 3s $^2S_{1/2}$- 3p $^2P_{1/2,3/2}$ doublet components to the external magnetic field spatially along the plasma. In these measurements the Zeeman splitting was not resolved, but the magnetic field strength was measured from the difference between the widths of the line profiles.

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