Abstract Submitted
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Magnetic Field Measurement in Magnetized Laser Plasmas Using Zeeman Broadening Diagnostics[1] S. HAQUE, M.S. WALLACE, A. ARIAS, University of Nevada Reno, T. MORITA, Osaka University, C. PLECHATY, C. HUNTINGTON, D. MARTINEZ, S.J. ROSS, H.-S. PARK, Lawrence Livermore National Laboratory, R. PRESURA, University of Nevada Reno — The Zeeman effect has been used to measure the magnetic field in high energy density plasmas. The measurements are difficult when the field orientation is fluctuating in the plasma volume or when the line broadening due to the high plasma density and temperature surpasses the Zeeman splitting. Based on an idea proposed by Tessarin *et al.* (2011), we implemented a solution to this problem to the field measurement in magnetized laser plasmas. High resolution spectra were obtained at the Nevada Terawatt Facility for plasmas created by 20 J, 400 fs Leopard laser pulses in the azimuthal magnetic field produced by the 0.6 MA Zebra pulsed power generator. The components of the Al III 3s $^2S_{1/2}$ – 3p $^2P_{1/2,3/2}$ were recorded with space resolution along the direction normal to the target, which coincided with the magnetic field radius. In several shots, the spectra were time gated for 10 ns at different values of the magnetic field. In these measurements the Zeeman splitting was not resolved, but the magnetic field strength can be measured from the difference between the widths of the line profiles.

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Radu Presura
University of Nevada Reno

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