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Spectroscopic and MHD modeling of magnetized cylindrical implosions using a laser-produced seed B-field[1] R. FLORIDO, ULPGC, Spain, C. A. WALSH, LLNL, USA, M. BAILLY-GRANDVAUX, F. N. BEG, C. MCGUFFEY, CER, UCSD, USA, A. CALISTI, S. FERRI, Univ. Aix-Marseille, CNRS, PIIM, France, M. A. GIGOSOS, Univ. Valladolid, Spain, R. C. MANCINI, Dept. Physics, UNR, USA, T. NAGAYAMA, SNL, USA, J. J. HONRUBIA, ETSIAE, UPM, Spain, J. R. DAVIES, LLE, Univ. Rochester, USA, F. SUZUKI-VIDAL, Imperial College London, UK, V. T. TIKHONCHUK, J. J. SANTOS, Univ. Bordeaux, CNRS, CEA, CELIA — We present a comprehensive simulation study of magnetized cylindrical implosions at OMEGA using laser-driven capacitor-coil targets to produce a seed, pre-compressed B field. Ar-doped, D2-filled cylindrical targets will be symmetrically imploded using a 15 kJ, 1.5 ns laser drive. The plasma dynamics are numerically investigated in 2-D with the MHD code GORGON, which predicts a B-field exceeding 10 kT over the entire compressed core and significantly higher temperatures compared to the unmagnetized case. Synthetic X-ray emission spectra computed with the NLTE atomic kinetics code ABAKO and detailed Stark-Zeeman broadening codes (MERL, PPP-B, DinMol) show distinctive spectral features for a magnetized implosion and the case without seed B-field. These results suggest the use of Argon K-shell spectroscopy to extract plasma conditions throughout the implosion and bring information about changes in the hydrodynamic behaviour due to the impact of the B-field.

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Ricardo Florido
ULPGC, Spain

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