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Spectroscopic Study of Laser-Ablated Carbon Plasmas ANTON BONDARENKO, DEREK SCHAEFFER, ERIK EVERSON, CARMEN CONSTANTIN, ERIC CLARK, CHRIS NIEMANN, UCLA — Exploding, energetic plasmas produced by laser ablation of solid targets have been extensively utilized in the field of laboratory astrophysics. In particular, super-Alfvénic plasma expansions into magnetized background plasmas are vital for laboratory investigations of collision-less shocks, diamagnetic cavity formation, and ion coupling in astrophysical environments. In ongoing experiments at the Phoenix laser facility at UCLA, emission spectroscopy has been utilized in order to better characterize expanding carbon plasmas generated via intense laser (200-600 GW/cm^2) ablation of graphite targets. The ablation plasmas are generated in vacuum, with and without the presence of a uniform external magnetic field ($\sim$ 800 G). A detailed spectroscopic survey in the 200-600 nm range has been conducted in order to identify the various carbon ionization stages present within the plasma, and the Doppler widths and shifts of several spectral lines have been measured in order to determine velocity distributions of the corresponding ions. The temporal evolution and 1-D spatial distribution of spectral line intensities have also been analyzed in order to generate a qualitative visualization of the carbon plasma expansion.

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