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**Magnetic Field Measurements in low Density Plasmas using Paramagnetic Faraday Rotator Glass** STEPHEN CLARK, DEREK SCHAEFFER, ERIK EVERSON, ANTON BONDARENKO, CARMEN CONSTANTIN, CHRISTOPH NIEMANN, Department of Physics and Astronomy, University of California Los Angeles, Los Angeles, CA 90095, USA, DAN WINSKE, Los Alamos National Laboratory, Los Alamos, New Mexico 87545, USA — Paramagnetic Faraday rotator glass (rare-earth doped borosilicate) with a high Verdet constant will be used to measure the magnetic field inside of low density Helium plasmas ($T_e \sim 5$ eV, $T_i \sim 1$ eV) with a density of n $\sim 10^{12}$ cm$^{-3}$. Linearly polarized light is sent through the glass such that the plane of polarization is rotated by an angle that depends on the strength of the magnetic field in the direction of propagation and the length of the crystal (6 mm). The light is then passed into an analyzer and photo-detector setup to determine the change in polarization angle. This setup can detect magnetic fields up to 5 kG with a resolution of $< 5$ G and a temporal resolution on the order of a nanosecond. The diagnostic will be used to characterize the structure and evolution of laser-driven collisionless shocks in large magnetized plasmas.

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