

Abstract Submitted
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Development of a polarization resolved spectroscopic diagnostic for measurements of the magnetic field in the Caltech coaxial magnetized plasma jet experiment TAIICHI SHIKAMA, PAUL M. BELLAN, Caltech

— Measurements of the magnetic field strength in current-carrying magnetically confined plasmas are necessary for understanding the underlying physics governing the dynamical behavior. Such a measurement would be particularly useful in the Caltech coaxial magnetized plasma gun, an experiment used for fundamental studies relevant to spheromak formation, astrophysical jet formation/propagation, solar coronal physics, and the general behavior of twisted magnetic flux tubes that intercept a boundary. In order to measure the field strength in the Caltech experiment, a non-perturbing spectroscopic method is being implemented to observe the Zeeman splitting in the emission spectra. The method is based on polarization-resolving spectroscopy of the Zeeman-split σ components, a technique previously used in both solar and laboratory plasmas. We have designed and constructed an optical system that can simultaneously detect left- and right-circularly polarized emission with both high throughput and small extinction ratio. The system will be used on the 489.5 nm NII line, chosen because of its simple Zeeman structure and minimal Stark broadening.

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