

Abstract Submitted
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Development of a polarization resolved spectroscopic diagnostic for measurements of the vector magnetic field in the Caltech coaxial magnetized plasma jet experiment¹ TAIICHI SHIKAMA, Caltech, Kyoto University, PAUL M. BELLAN, Caltech — In the Caltech coaxial magnetized plasma jet experiment, fundamental studies are carried out 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 spatial profile of the magnetic field vector for understanding the underlying physics governing the dynamical behavior, a non-perturbing visible emission spectroscopic method is implemented to observe the Zeeman splitting in emission spectra. We have designed and constructed a polarization-resolving optical system that can simultaneously detect the left- and right-circularly polarized emission. The system is applied to singly ionized nitrogen spectral lines. The magnetic field strength is measured with a precision of about ± 13 mT. The radial profiles of the azimuthal and axial vector magnetic field components are resolved by using an inversion method.

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