

Abstract Submitted
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Measurement of magnetic null and field reversal in FRC plasmas using the Hanle effect DEEPAK GUPTA, Tri Alpha Energy, KENNETH NORDSIECK, University of Wisconsin, Madison, RICHARD IGNACE, East Tennessee State University, Johnson City, JOHN KINLEY, MARCEL NATIONS, Tri Alpha Energy, TAE, TRI ALPHA ENERGY, INC. TEAM — In FRC plasmas, knowledge of the magnetic null location is required for understanding and comparison with theory and modeling. More fundamentally, one would first like to affirm the presence of field reversal. Conventional methods like internal magnetic probes, Zeeman effect, MSE, etc. have limitations, either due to their perturbative nature or the relatively low internal magnetic fields of FRCs. Here, use of the Hanle effect to measure the magnetic null and field reversal in an FRC is presented. The measurements utilize polarization of resonance radiation from the ions in the plasma using either external illumination or self-illumination. The mechanism of the Hanle effect, conditions of its use as a plasma diagnostic, and various schemes for measurements in an FRC will be presented, along with results from initial tests using a DC plasma discharge with varying magnetic field. The diagnostic design for the C-2W FRC plasma experiment will be discussed.

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