

Abstract Submitted
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Initial Results From The Polarimetry Upgrade To The Far-Infrared Interferometer-Polarimeter On C-2W E. PARKE, M. BEALL, M. KAUR, J. KINLEY, R. J. SMITH, AND THE TAE TEAM, TAE Technologies, Inc. — In TAE Technologies’ current experimental device, C-2W (also called “Norman”) [1], record breaking, advanced beam-driven field reversed configuration (FRC) plasmas are produced and sustained in steady state utilizing variable energy neutral beams, advanced divertors, end bias electrodes, and an active plasma control system. Measurements of the equilibrium profiles and fluctuations of the plasma density and magnetic field are critical for understanding FRC behavior and improving performance. The far-infrared interferometer-polarimeter diagnostic on C-2W has reliably operated as a two-wave interferometer for density measurements along 14 chords with high time resolution. The system upgrade to a three-wave diagnostic for simultaneous interferometer-polarimeter operation is underway, with the planned capability to resolve predicted Faraday rotation angles less than 0.5 degrees while maintaining high bandwidth for fluctuation measurements. We evaluate the impact of vibrations on the phase measurement and present efforts to mitigate them. We will present the design and status of the upgrade, with initial measurements of equilibrium magnetic profiles in FRC plasmas. [1] H. Gota et al., Nucl. Fusion 59, 112009 (2019)

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