

Abstract Submitted
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Near-infrared Bremsstrahlung radiation measurements in an advanced beam-driven FRC plasma MARCEL NATIONS, DEEPAK GUPTA, NATHAN BOLTE, MATTHEW C. THOMPSON, TAE TEAM, Tri Alpha Energy, Foothill Ranch, CA — In magnetically confined fusion plasmas, the effective ionic charge (Z_{eff}) is a measure of plasma impurity content. Knowledge of Z_{eff} profiles is critical since impurities can account for substantial radiative power losses. One method to determine Z_{eff} is to measure the Bremsstrahlung continuum over a small spectral range free from line radiation. In TAE's C-2 and C-2U machines, impurities in apparently line-free regions near 523 nm overwhelmed the expected Bremsstrahlung signals and resulted in overestimated values of Z_{eff} . The near-infrared region is less affected by impurities and better suited for accurate Bremsstrahlung continuum measurements. For C-2W, an upgraded diagnostic system will be deployed to measure Bremsstrahlung signals near 1000 nm. The near-infrared system uses a suite of silicon avalanche photodetectors paired with a D_α system to remove contributions from neutrals and attain improved Z_{eff} estimates. A design scheme for measurements in an FRC at multiple lines-of-sight is presented and discussed.

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