Abstract Submitted
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Studies of C-2U plasmas using Time-Resolved Multi-Chord Ion-Doppler Diagnostic (MCID) DEEPAK GUPTA, BIHE DENG, KAN ZHAI, THOMAS ROCHE, ERIK GRANSTEDT, MATTHEW THOMPSON, MICHEL TUSZEWSKI, Tri Alpha Energy, THE TAE TEAM — C-2U [1] has achieved steady-state operation of advanced beam-driven FRCs using neutral beam injection and edge biasing. To characterize this novel C-2U regime, MCID regularly measures time-resolved radial profiles of impurity ion emissivity, ion velocity, and ion temperature. Comparing thermal-ion temperatures with the pressure balance total temperatures provides the fast-ion pressure in the advanced beam-driven FRC state. Impurity ion measurement together with radial momentum balance yields radial profiles of electric field and electron current density. Such estimates were explored with Helium-mixed FRC plasmas on C-2 [2], and are now performed by using indigenous Oxygen impurities in the advance beam-driven plasmas in C-2U. Conditions and dependence of possible ion heating via edge biasing are also explored. The detailed MCID setup for radial/axial profile measurements and data for multiple physics phenomena will be presented.

[1] M.W. Binderbauer *et al.*, Phys. Plasmas **22**, 056110 (2015)
[2] D. Gupta *et al.*, Bull. Am. Phys. Soc. **58**, GP8.00038 (2013)

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