Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Fast ion diagnostics (FIDA) on C-2W LUCAS MORTON, ERIK GRANSTEDT, NATHAN BOLTE, RICHARD MAGEE, DEEPAK GUPTA, GABRIEL PLAYER, SEAN DETTRICK, TAE Technologies, TAE TEAM TEAM
— 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 (15 – 40 keV, total power up to 20 MW), advanced divertors, end bias electrodes, and an active plasma control system. An in-house model of fast ion orbits and transport was used in conjunction with FIDASIM to explore optimized lines-of-sight for detection of fast ion populations and loss channels. We evaluated emission resulting from fast ion charge exchange (CX) interactions with the heating neutral beams, diagnostic neutral beam, cold edge neutrals, and gas puff valves. A midplane view can provide radially-resolved information on the azimuthal component of the fast ion velocity distribution. Passive emission from large-orbit fast ions interacting with neutrals in the scrape-off layer could inform estimated rates of ion CX loss and slowing-down. Gas puffing provides a way to actively probe the fast ion distribution in regions (such as the mirror throat) where there is no NBI. Preliminary comparisons with data from the main-ion CX diagnostic system will be shown. [1] H. Gota et al., Nucl. Fusion **59**, 112009 (2019).

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Date submitted: 29 Jun 2020 Electronic form version 1.4