

Abstract Submitted  
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**Whole Device Modeling of Compact Tori: Stability and Transport Modeling of C-2W** SEAN DETTRICK, DANIEL FULTON, Tri Alpha Energy, CALVIN LAU, ZHIHONG LIN, University of California, Irvine, FRANCESCO CECCHERINI, LAURA GALEOTTI, SANGEETA GUPTA, MARCO ONOFRI, TOSHIKI TAJIMA, Tri Alpha Energy, TAE TEAM — Recent experimental evidence from the C-2U FRC experiment shows that the confinement of energy improves with inverse collisionality [1], similar to other high beta toroidal devices, NSTX [2,3] and MAST [4]. This motivated the construction of a new FRC experiment, C-2W, to study the energy confinement scaling at higher electron temperature. Tri Alpha Energy is working towards catalysing a community-wide collaboration to develop a Whole Device Model (WDM) of Compact Tori. One application of the WDM is the study of stability and transport properties of C-2W using two particle-in-cell codes, ANC and FPIC. These codes can be used to find new stable operating points, and to make predictions of the turbulent transport at those points. They will be used in collaboration with the C-2W experimental program to validate the codes against C-2W, mitigate experimental risk inherent in the exploration of new parameter regimes, accelerate the optimization of experimental operating scenarios, and to find operating points for future FRC reactor designs. [1] M. Binderbauer, et al., Phys. Plasmas, 22 (2015) 56110; [2] S. Kaye, et al. Nucl. Fusion, 47 (2007) 499; [3] S. Kaye, et al. Nucl. Fusion, 53 (2013) 63005; [4] M. Valovi, et al. Nucl. Fusion, 51 (2011) 73045

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