Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Benchmarking a hybrid MHD/kinetic code with C-2 experimental data RICHARD MAGEE, RYAN CLARY, SEAN DETTRICK, SERGEY KOREPANOV, MARCO ONOFRI, ARTEM SMIRNOV, Tri Alpha Energy, Inc., P.O. Box 7010, Rancho Santa Margarita, CA 92688, USA, THE TAE TEAM — The C-2 device creates field-reversed configuration (FRC) plasmas via the dynamic merging of two compact toroids and heated with neutral beams.[1] Simulations of these plasmas are performed with Q2D - a hybrid MHD/Monte Carlo code that evolves the plasma according to the resistive MHD equations and treats the neutral beam injected fast ions as a minority kinetic species.[2] Recent Q2D runs have resulted in testable predictions, namely that the axial profile of the fast ions is double-peaked, and charge-exchange neutrals are localized in pitch-angle. In some simulations, the fast particle population can induce magnetic fluctuations. These fluctuations are largest in the radial component, have a characteristic frequency approximately equal to the fast ion bounce frequency ($f \approx 150$ kHz), and a broad k spectrum. These fluctuations have the beneficial effect of smoothing out the double-peaked axial fast ion density profile, resulting in an increased fast ion density at the mid-plane. We will present results from a benchmarking study to quantitatively compare the results of Q2D runs to existing C-2 experimental data.

[1]M. Tuszewski et al., *Phys. Rev. Lett.* **108**, 255008 (2012).
[2]M. Onofri et al., this conference

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Date submitted: 12 Jul 2013 Electronic form version 1.4