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Simulations of the C-2/C-2U Field Reversed Configurations with the Q2D code MARCO ONOFRI, SEAN DETTRICK, DANIEL BARNES, TOSHIKI TAJIMA, Tri Alpha Energy, TAE TEAM — C-2U was built to sustain advanced beam-driven FRCs for 5+ ms. The Q2D transport code is used to simulate the evolution of C-2U discharges and to study sustainment via fast ion current and pressure, with the latter comparable to the thermal plasma pressure. The code solves the MHD equations together with source terms due to neutral beams, which are calculated by a Monte Carlo method. We compare simulations with experimental results obtained in the HPF14 regime of C-2 [1] (6 neutral beams with energy of 20 keV and total power of 4.2 MW). All simulations start from an initial equilibrium and transport coefficients are chosen to match experimental data. The best agreement is obtained when utilizing an enhanced energy transfer between fast ions and the plasma, which may be an indication of anomalous heating due to beneficial beam-plasma instabilities. Similar simulations of C-2U (neutral beam power increased to 10+ MW and angled beam injection) are compared with experimental results, where a steady state has been obtained for 5+ ms, correlated with the neutral beam pulse and limited by engineering constraints.

[1] M. Binderbauer et al., *Physics of Plasmas* 22, 056110 (2015)

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