Abstract Submitted
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Transport simulations of an FRC plasma with neutral beam injection MARCO ONOFRI, SEAN DETTRICK, Tri Alpha Energy, Inc., P.O. Box 7010, Rancho Santa Margarita, CA 92688, USA, DAN BARNES, Tri Alpha Energy, TAE TEAM — The evolution of a Field Reversed Configuration with neutral beam injection is studied using the Q2D code. The code solves the MHD equations including source terms due to neutral beams, which are calculated by a Monte Carlo code. We compare numerical simulations with experimental results obtained in C-2 [1], where five neutral beams are injected into the plasma with energy of 20 keV and total power up to 3.5 MW. Transport simulations of C-2 start from an initial equilibrium and transport coefficients are chosen to obtain the best agreement with experiments. The same initial equilibrium and transport coefficients are used for predictions of an upgraded machine, C-2U, where the neutral beams have a total power of 10 MW and may be injected at different angles from the perpendicular to the axis. The simulations show the formation of sustained FRCs. Resultant FRCs are longer for larger beam angles, while smaller angles produce shorter FRCs, but with higher temperatures. The beam impact parameter also has an important effect on plasma heating.

[1] M. Tuszewski et al., Phys. Rev. Lett. 108, 255008 (2012)

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