Characterization of magnetohydrodynamic transport in a Field Reversed Configuration MARCO ONOFRI, PETER YUSHMANOV, SEAN DETTRICK, DANIEL BARNES, KEVIN HUBBARD, TOSHI TAJIMA, Tri Alpha Energy, TAE TEAM — Transport in a Field Reversed Configuration (FRC) is studied by using the two-dimensional code Q2D, which couples a magnetohydrodynamic code with a Monte Carlo code for the beam component. The simulation by Q2D of the parallel transport in the simple open $\theta$-pinch fields and its associated outflow shows an excellent agreement with one of the existing theories, providing a benchmark for Q2D and simultaneously deepening the theoretical understanding of this fundamental process. We find a sharp distinction between the evolved radial density profiles of the FRC and mirror plasmas as a result of the transport processes, showing that the closed flux surfaces of an FRC enhance the confinement over that of a mirror. We characterize the scrape-off layer (SOL) transport by including the mirror trapping effects and we find a relation between the confinement time in the SOL and the ion collisional time. The Q2D code is also used to study the formation of the electrostatic potential in the divertor.

Marco Onofri
Tri Alpha Energy

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