

Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Modeling Ferritic Inserts with ANSYS-MAXWELL to Reduce Coil Ripple in Stellarators¹ THOMAS KRUGER, CARL MARTIN, DAVID ANDERSON, AARON BADER, LUQUANT SINGH, University of Wisconsin - Madison — Confinement of energetic particles is a critical issue for a fusion reactor. Ferritic inserts are used in ITER to reduce losses of energetic particles. This poster shows an initial implementation of ferritic inserts in a stellarator to reduce “coil ripple” and reduce losses. In order to produce a desired equilibrium with coils, it is advantageous to have the coils close to the plasma. However, this introduces a coil ripple term in the magnetic spectrum with toroidal number equal to the number of coils. This mode can reduce the confinement of energetic particles due to their trapping in coil ripple wells. Ferritic inserts can reduce coil ripple by decreasing magnetic flux density at the coil and increasing magnetic flux between the coils. We present ANSYS-MAXWELL simulations of shaped tokamaks and HSX as an example of a stellarator with and without ferritic inserts. We present the magnetic spectra showing the effects of the ferritic inserts on the amplitudes of all the modes.

¹Supported by US DOE under grant DE-FG02-93ER54222 and UW Foundation under grant 135AAD3116

Thomas Kruger
University of Wisconsin - Madison

Date submitted: 03 Jul 2019

Electronic form version 1.4