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Turbulent transport optimization in stellarators: trapped electron modes[1] C. C. HEGNA, B. J. FABER, I. J. MCKINNEY, P. W. TERRY, University of Wisconsin - Madison — Using three-dimensional shaping to reduce turbulent transport is an emerging theme in stellarator optimization. Recent work focused on understanding turbulent saturation physics as a means to affect ion temperature gradient instability induced transport [C. C. Hegna, et al, Phys. Plasmas 25, 022511 (2018)]. In this work, the dominant nonlinear energy transfer channel is determined by a three-wave interaction involving instabilities coupling to damped modes at comparable wavelength. The theory identifies metrics for turbulent suppression that are strong functions of 3D shaping. We are expanding this model to include the effects of trapped electron mode turbulence. This is accomplished through the introduction of bounce-averaged trapped electron modifications to a fluid model.

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