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Anisotropic Heat Transport in the Presence of Resonant Magnetic Perturbations SCOTT KRUGER, Tech-X Corporation, ERIC HELD, Utah State University — Heat transport in the H-mode tokamak edge is significantly modified by the presence of resonant magnetic perturbations. Application of collisional transport models to this problem ignores the fact that temperatures at the top of the edge pedestal may be several keV. Here, we compare the effective radial heat transport predicted by local (diffusive) and nonlocal [1] (integral) forms for the parallel heat flux. Accurately predicting this effective radial heat transport becomes important when significant magnetic field line stochasticity is present, as in the case of overlapping magnetic perturbations. For such cases, the integral form for the parallel heat transport correctly assesses the effects of temperature perturbations all along the magnetic field line and yields predictions that vary substantially from the diffusive closure, which relies only on the local temperature gradient. Quantitative comparisons of effective radial transport are given for single helicity and multiple helicity magnetic perturbations in cylindrical and toroidal geometry, with emphasis given to a toroidal case with a narrow pedestal width and a high temperature at the top of the pedestal.
[1] E. D. Held, J. D. Callen, C. C. Hegna, C. R. Sovinec, T. A. Gianakon, and S. E. Kruger, Phys Plasmas, 11, 2419 (2004).

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