This contribution is addressed to category 2 ”Transport of energy in stochastic fields”.

Numerical modeling of heat transport across magnetic islands and highly stochastic field layers

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The large anisotropy of heat conduction is a great challange for exact numerical heat flux computations. Using a recently developed numerical scheme, the heat flux across magnetic islands and highly stochastic layers is examined in unaligned coordinates.

A detailed picture of the heat flux around a magnetic island is given and the consequences for NTM stability are discussed. Fitzpatrick derived analytical results for the growth rate of neoclassical tearing modes in the limits of very small and very large islands and performed a matching of the two limits to get a closed analytical expression. The limits are found from numerical results, but the closed analytical expression is shown to underestimate the growth rate.

For heat transport across highly stochastic layers, the collisional regime is according to Krommes divided into three subregimes. With increasing collisionality, these are the Rechester-Rosenbluth regime, the Kadomtsev-Pogutse regime and the fluid regime. The numerical results are compared to these analytical predictions.