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Parallel heat transport in reversed shear magnetic field configurations D. BLAZEVSKI, University of Texas at Austin, D. DEL-CASTILLO-NEGRETE, Oak Ridge National Laboratory — Transport in magnetized plasmas is a key problem in controlled fusion, space plasmas, and astrophysics. Three issues make this problem particularly challenging: (i) The extreme anisotropy between the parallel (i.e., along the magnetic field), $\chi_\parallel$, and the perpendicular, $\chi_\perp$, conductivities ($\chi_\parallel/\chi_\perp$ may exceed 10^{10} in fusion plasmas); (ii) Magnetic field lines chaos; and (iii) Nonlocal parallel transport. We have recently developed a Lagrangian Green's function (LG) method to solve the local and non-local parallel ($\chi_\parallel/\chi_\perp \to \infty$) transport equation applicable to integrable and chaotic magnetic fields.[1] The proposed method overcomes many of the difficulties faced by standard finite different methods related to the three issues mentioned above. Here we apply the LG method to study transport in reversed shear configurations. We focus on the following problems: (i) separatrix reconnection of magnetic islands and transport; (ii) robustness of shearless, $q' = 0$, transport barriers; (iii) leaky barriers and shearless Cantori.

[1]D. del-Castillo-Negrete, L. Chacón, PRL, **106**, 195004 (2011); D. del-Castillo-Negrete, L. Chacón, Phys. Plasmas, APS Invited paper, submitted (2011).

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