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Asymptotic-preserving Lagrangian approach for modeling anisotropic transport in magnetized plasmas for arbitrary magnetic fields LUIS CHACON, ORNL and LANL, DIEGO DEL-CASTILLO-NEGRETE, CORY HAUCK, ORNL — Modeling electron transport in magnetized plasmas is extremely challenging due to the extreme anisotropy between parallel (to the magnetic field) and perpendicular directions ($\chi_\parallel/\chi_\perp \sim 10^{10}$ in fusion plasmas). Recently, a Lagrangian Green's function approach, developed for the purely parallel transport case,[1,2] has been extended to the anisotropic transport case in the tokamak-ordering limit with constant density.[3] An operator-split algorithm is proposed that allows one to treat Eulerian and Lagrangian components separately. The approach is shown to feature bounded numerical errors for *arbitrary* $\chi_\parallel/\chi_\perp$ ratios, which renders it asymptotic-preserving. In this poster, we will present the generalization of the Lagrangian approach to arbitrary magnetic fields. We will demonstrate the potential of the approach with various challenging configurations, including the case of transport across a magnetic island in cylindrical geometry.

[1]D. del-Castillo-Negrete, L. Chacón, *PRL*, **106**, 195004 (2011)
[2]D. del-Castillo-Negrete, L. Chacón, *Phys. Plasmas*, **19**, 056112 (2012)
[3]L. Chacón, D. del-Castillo-Negrete, C. Hauck, *JCP*, submitted (2012)

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