

Abstract Submitted
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Anisotropic Thermal Diffusion THOMAS GARDINER, Sandia National Laboratories — Anisotropic thermal diffusion in magnetized plasmas is an important physical phenomena for a diverse set of physical conditions ranging from astrophysical plasmas to MFE and ICF. Yet numerically simulating this phenomenon accurately poses significant challenges when the computational mesh is misaligned with respect to the magnetic field. Particularly when the temperature gradients are unresolved, one frequently finds entropy violating solutions with heat flowing from cold to hot zones for $\chi_{\parallel}/\chi_{\perp} \geq 10^2$ which is substantially smaller than the range of interest which can reach 10^{10} or higher. In this talk we present a new implicit algorithm for solving the anisotropic thermal diffusion equations and demonstrate its characteristics on what has become a fairly standard set of test problems in the literature. Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000. SAND2013-5687A

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