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A Discontinuous Galerkin Method for Spectral Neutrino Transport[1] EIRIK ENDEVE, Oak Ridge National Lab, RAN CHU, University of Tennessee, Knoxville, CORY HAUCK, Oak Ridge National Lab, ANTHONY MEZZACAPPA, University of Tennessee, Knoxville — We are developing methods for simulation of multi-dimensional neutrino transport in nuclear astrophysics applications (e.g., core-collapse supernovae and binary neutron star mergers). We aim to develop methods that are accurate and robust. Here we consider a multi-group two-moment model, where the spectral particle density $\mathcal{N}$ and flux $\mathcal{F}$ – angular moments of a phase space distribution function f – approximates the radiation field in a computationally tractable manner. Our approach is based on the Runge-Kutta discontinuous Galerkin method[2]. Building on our previous work[3], we are developing a method that maintains realizable solutions in the sense that $\mathcal{N}$ and $\mathcal{F}$ remains consistent with moments of an underlying Fermi-Dirac distribution (satisfying $0 \leq f \leq 1$). We present details of the physical model, the numerical method, and show preliminary numerical results.

[1]US Department of Energy and National Science Foundation
[2]Cockburn & Shu 2001, J. Sci. Comput. **16**, 173-261
[3]Endeve et al. 2015, JCP, 287, 151-183

Eirik Endeve
Oak Ridge National Lab

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