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Discontinuous Galerkin Methods for Neutrino Radiation Transport[1] EIRIK ENDEVE, CORY HAUCK, YULONG XING, Oak Ridge National Laboratory, ANTHONY MEZZACAPPA, University of Tennessee Knoxville — We are developing new computational methods for simulation of neutrino transport in core-collapse supernovae, which is challenging since neutrinos evolve from being diffusive in the proto-neutron star to nearly free streaming in the critical neutrino heating region. To this end, we consider conservative formulations of the Boltzmann equation,[2] and aim to develop robust, high-order accurate methods. Runge-Kutta discontinuous Galerkin (DG) methods,[3] offer several attractive properties, including (i) high-order accuracy on a compact stencil and (ii) correct asymptotic behavior in the diffusion limit. We have recently developed a new DG method for the advection part for the transport solve,[4] which is high-order accurate and strictly preserves the physical bounds of the distribution function; i.e., $f \in [0, 1]$. We summarize the main ingredients of our bound-preserving DG method and discuss ongoing work to include neutrino-matter interactions in the scheme.

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[2]Cardall, Endeve, & Mezzacappa 2013, Phys. Rev. D **88**, 023011
[3]Cockburn & Shu 2001, J. Sci. Comput. **16**, 173-261
[4]Endeve, Hauck, Xing, & Mezzacappa 2015 (arXiv:1410.7431)

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