

TEMPLE UNIVERSITY
Department of Mathematics

Applied Mathematics and Scientific Computing Seminar

Wednesday, 13 February 2013, 4:00 p.m.
Room 617 Wachman Hall

(refreshments and social at 3:45 p.m)

Discontinuous Galerkin method for moment closure models for radiative transfer

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Abstract. Radiative transport equation calculations have important applications in determining the interaction between high energy particle propagation and body tissue in radiation dose therapy. We apply the Runge-Kutta discontinuous Galerkin (RKDG) method to moment models for the radiative transfer equation. Our goal is to resolve the time evolution of isolated sources or beams of particles in heterogeneous media on unstructured grids. The moment models considered are nonlinear hyperbolic balance laws. We present a third order Runge-Kutta discontinuous Galerkin scheme to solve the moment models. In addition, we present numerical results to verify optimal high order convergence for smooth solutions as well as benchmark test cases from the literature. Our application is on large computational domains therefore parallelization is an important component. We also present numerical results illustrating the scalability of a third order parallel scheme.