1171-65-214 **James A Rossmanith*** (rossmani@iastate.edu), 411 Morrill Road, Ames, IA 50011, and **Christine Vaughan** and **Alberto Passalacqua**. *Spectral Element Moment-Closures for Kinetic Models.*

In many applications, the dynamics of gas and plasma can be accurately modeled using kinetic Boltzmann equations. These equations are integrodifferential systems posed in high-dimensional phase space. If the system is sufficiently collisional, the kinetic equations may be replaced by a fluid approximation. In general, finding a suitable robust moment-closure is still an open problem. In this work, we consider spectral element moment-closures, in which we first divide the velocity space into a discrete mesh, and then introduce moments that are local only to each velocity space element. In standard moment-closures the only mechanism to improve the approximation is to add more global moments; in the spectral element approach, one can either vary the number of moments in each velocity element, vary the number of velocity elements, or both. An important advantage of this approach is that we are able to utilize in each velocity element a simple linear moment-closure that is provably symmetric hyperbolic, rather than a nonlinear closure that may be only conditionally hyperbolic. We develop for this closure a high-order discontinuous Galerkin scheme and test apply to various test problems. (Received August 11, 2021)