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Hailiang Liu* (hliu@iastate.edu), Iowa State University, Carver 434, Ames, IA 50011. *Direct Discontinuous Galerkin Methods for Dispersive Integrable Equations.*

In this talk, I shall discuss the recent development of direct discontinuous Galerkin methods for solving dispersive integrable equations, including both the KdV equation and the Degasperis-Procesi equation. The DP equation is integrable, but admits possibly discontinuous solutions, and therefore suitable for modeling both short wave breaking and long wave propagation phenomena. The proposed DG method is high order accurate, and preserves two invariants, momentum and energy, of this nonlinear equation, hence producing wave solutions with satisfying long time behavior. The L2-stability of the scheme for general solutions is a consequence of the energy preserving property. The numerical simulation results for different types of solutions of the nonlinear Degasperis-Procesi equation are provided to illustrate the accuracy and capability of the method. This is a joint work with Yunqing Huang and Nianyu Yi. (Received March 04, 2013)