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The Regionally Implicit Discontinuous Galerkin Method: Application to the Relativistic Vlasov-Maxwell system PIERSON GUTHREY, Michigan State University, JAMES ROSSMANITH, Iowa State University, ANDREW CHRISTLIEB, Michigan State University — The motivation of this work is to develop an efficient solver for models of collision-less high energy plasmas. These types of plasmas are studied in the context of, for example, a Wakefield Accelerator [Schlenvoigt 2008] where a laser causes plasma waves to accelerate electrons to nearly the speed of light. The relativistic Vlasov-Maxwell (RVM) system models such laser-plasma interactions and in particular, models the acceleration of electrons to relativistic energies. This system introduces numerical difficulties which are not present in the nonrelatisvistic limit, namely that operator splitting the Lorentz Force term leads to unphysical instabilities as explained in [Huot 2003]. We offer the Regionally Implicit Discontinuous Galerkin (RIDG) method [Guthrey Rossmanith 2019] as an efficient alternative to operator splitting.

Pierson Guthrey
Michigan State University

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