

# **A Hybrid Discontinuous Galerkin Scheme for Multi-Scale Kinetic Equations**

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We develop a multi-dimensional hybrid discontinuous Galerkin method for multi-scale kinetic equations. This method is based on moment realizability matrices, a concept introduced by D. Levermore, W. Morokoff and B. Nadiga. The main issue addressed in this work is to provide a simple indicator to select the most appropriate model and to apply a compact numerical scheme to reduce the interface region between different models. We also construct a numerical flux for the fluid model obtained as the asymptotic limit of the flux of the kinetic equation. We perform several numerical simulations for time evolution and stationary problems, to illustrate the effectiveness and efficiency of our proposed approach.