Sparse Grid Methods in Discontinuous Galerkin Algorithms, and Initial Continuum Gyrokinetic Simulations of NSTX-like SOL Turbulence[1] AMMAR HAKIM, GREG HAMMETT, ERIC SHI, Princeton Plasma Physics Laboratory — We have developed a hybrid discontinuous/continuous Galerkin scheme for gyrokinetic equations. Our scheme solves the equations in the Poisson bracket formulation and, with a careful choice of basis functions, conserves energy exactly. We use a sparse grid representation to reduce cost. We have developed a novel form of sheath boundary conditions, going beyond logical-sheath BCs, that allows current flow into the boundaries, yet retains overall charge continuity as well as conserves energy. First applications to a simplified model of the NSTX-like scrape-off-layer (SOL) are presented. We treat the SOL in simplified geometry, retaining magnetic curvature effects, and study the turbulent spreading of particle and heat flux. Extensions to include magnetic fluctuations and collisions are discussed.

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