Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Ballooning Modes for Hall-MHD Plasmas with Shear Flow
ELIEZER HAMEIRI, New York University — Our past work on ballooning modes in MHD plasmas with shear flow[1] has shown that such modes do exist but, rather than being stationary, they drift along the magnetic field line at a poloidal angular velocity equal to the ratio of the toroidal shear flow to the magnetic shear. In the present work we show that the ballooning modes also exist in a Hall-MHD plasma with shear flow, a fact which was in doubt up to now. The mode also drifts along a field line, as in MHD. But it should be noted that in order to go to the ballooning limit ($n \to \infty$), one must also scale the Hall term parameter (the ion skin depth) to be comparable to the width of the mode, with both shrinking to zero. In order to investigate further the properties of the ballooning mode, the equations of which are rather complicated, we use a simplified configuration where the drift of the mode can be removed by transforming to a coordinate system moving along a field line, in a way that leaves a time-independent equation being analyzable by eigenvalues instead of Floquet behavior. So far we have worked out the MHD limit as a basis for comparison, since this case allows for very precise results. The Hall-MHD case is being pursued. [1]E. Hameiri and S.T. Chun, *Phys. Rev. A* **41**, 1186 (1990).

Eliezer Hameiri
New York University

Date submitted: 19 Jul 2007 Electronic form version 1.4