1145-76-1344     **Kazuo Yamazaki\*** (`kyamazak@ur.rochester.edu`), 1017 Hylan Hall, Department of Mathematics, University of Rochester, Rochester, NY 14627. *Well-posedness and ergodicity of three-dimensional Hall-magnetohydrodynamics system.*

The Hall-magnetohydrodynamics system (Hall-MHD) plays an important role in astrophysical plasmas, star formation and magnetic re-connection. Ergodicity issues of the 2-d Navier-Stokes equations has caught much attention in the last decade. However, the Hall-MHD system has a very singular structure and mathematical analysis on this system has been delayed until very recently; in particular, the Navier-Stokes equations is semilinear while the Hall-MHD system is quasilinear. In this talk we describe some ergodicity results comparing the case of the standard MHD system and the Hall-MHD system. For the former system, we are able to prove irreducibility, existence of a Markov selection, weak-strong uniqueness, and that Markov solution has the strong Feller property. Consequently it is deduced that if the MHD system is well posed starting from one initial data, then it is well posed starting from any initial data, verifying a sharp contrast to the deterministic case in which the well posedness for all time with small initial data is well known. For the latter system, we were able to prove only the first three results due to the singularity of the Hall term; thus, the strong Feller property of the 3-d Hall-MHD system is an open problem. (Received September 21, 2018)