1139-35-39 **Kazuo Yamazaki***, 1017 Hylan Hall, Department of Mathematics, University of Rochester, Rochester, NY 14627. *A few examples on the property of the noise in PDE of fluid mechanics.*

In this talk I will discuss a few examples of situations in which the noise permits some results for the randomly forced PDE in fluid mechanics for which there is no counterpart in the deterministic case.

In particular, it is well-known that for a deterministic system of nonlinear PDE in fluid mechanics, lack of diffusion makes it difficult, impossible actually to the best of my knowledge, for anybody to obtain a global well-posedness result with small initial data. As an example, I will describe how the Hall-MHD system forced by Levy noise with no velocity dissipation still allows a global well-posedness result with small initial data.

Secondly, it is well-known that Kelvin's conservation of circulation holds for the Euler equations but not the Navier-Stokes equations. Similarly it may be shown that the damped Euler equations has an exponential decay (in time) of the circulation but the identity no longer holds for the damped Navier-Stokes equations. Nevertheless, using stochastic Lagrangian formulation, it can be shown that these properties continue to hold even in the dissipative case "on average" (i.e. through expectation). Similar results are obtained for the Boussinesq system, Leray-alpha MHD system, micripolar and magneto-micropolar fluid systems as well. (Received January 15, 2018)