Stochastic modelling of prey-predator model of the Low-to-High Confinement Transition[1] EUN-JIN KIM, Coventry University, Fluid and Complex Systems Research Centre, RAINER HOLLERBACH, University of Leeds — We report a first study of time-dependent Probability Density Functions (PDFs) in the Low-to-High confinement mode (L-H) transition by extending the previous prey-predator-type model (Kim Diamond, Phys. Rev. Lett. 91, 185006, 2003) to a stochastic model. We highlight the limited utility of mean value and variance in understanding the L-H transition by showing strongly non- Gaussian PDFs, with the number of peaks changing in time. We also propose a new information geometric method by using information length, dynamical time scale, and information phase portrait, and show their utility in forecasting transitions and self-regulation between turbulence and zonal flows. In particular, we demonstrate the importance of intermittency (rare events of large amplitude) of zonal flows that can play an important role in promoting the L-H transition. Implications for hysteresis in the L-H and H-L transition are discussed. Reference E. Kim and R. Hollerbach, Phys. Rev. Res. 2, 023077 (2020).

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Date submitted: 29 Jun 2020

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