Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

On deterministic nature of intermittent geodesic acoustic mode observed in tokamaks ZHAOYANG LIU, Department of engineering and Applied Physics, University of Science and Technology of China, YANGZHONG ZHANG, Center for Magnetic Fusion Theory, Chinese Academy of Sciences, SWADESH M. MAHAJAN, Institute for Fusion Studies, University of Texas at Austin, Austin, TAO XIE, School of Science, Sichuan University of Science and Engineering, AHDI LIU, CHU ZHOU, TAO LAN, JINLIN XIE, HONG LI, GE ZHUANG, WANDONG LIU, Department of engineering and Applied Physics, University of Science and Technology of China — Through a carefully designed numerical experiment, we demonstrate that a transition between two distinct phases of energy concentration in a zonal flow-drift wave system (caviton and instanton) may play a key role in the intermittent excitation of geodesic acoustic mode (GAM) that are observed in tokamaks. The two energy structures - the caviton, a slowly breathing spatial local structure of 'negative' energy, and the instanton, a fine radial structure of short lifetime in rapid propagation, were recently identified in [Zhang Y. Z., Liu Z. Y., Xie T., Mahajan S. M., and Liu J. 2017 Physics of Plasmas **24**, 122304] (now extended to include GAM). The transition (decay) from the former to the latter is triggered by a rapid zero-crossing of radial group velocity of drift wave and is found to be strongly correlated with the GAM onset. Many features peculiar to intermittent GAMs, observed in real machines, are identified in the numerical experiment; the results will be displayed in figures and in a movie.

Zhaoyang Liu
University of Science and Technology of China

Date submitted: 08 Jul 2019 Electronic form version 1.4