



# SPECIAL PHYSICS LECTURE

Ramakrishna Mission Vivekananda  
Educational and Research Institute

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(3:15 pm)



## *Collective $1/f$ fluctuations by pseudo-Casimir-invariants*

Prof. Yoshiyuki Yamaguchi

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About the speaker:

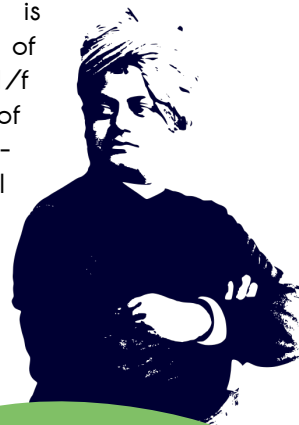
Prof. Yamaguchi obtained his PhD from Nagoya University in 1998.

After working in Ritsumeikan University as a Post-Doc for one year, from 1999 he belongs to the Graduate School of Informatics at Kyoto University. His main research areas are in nonlinear dynamics and statistical mechanics.

**Abstract:** The  $1/f$  fluctuation is ubiquitously observed in nature and has attracted general interest over the past few decades. In this talk, we concentrate on collective motion in Hamiltonian systems with many degrees of freedom under long-range interaction, such as self-gravitating systems, plasmas, 2D Euler fluids, and so on. Dynamics of a long-range Hamiltonian system is described by the Vlasov equation, which has an infinite number of Casimir invariants. We propose a scenario to explain  $1/f$  fluctuations by introducing the phenomenological concept of pseudo-Casimir-invariants [1]. We first explain what are pseudo-Casimir-invariants, and then perform systematic numerical simulations to examine the proposed scenario.

This work is in collaboration with K. Kaneko.

[1] Y. Y. Yamaguchi and K. Kaneko, Collective  $1/f$  fluctuation by pseudo-Casimir-invariants, Phys. Rev. E 98, 020201(R) (2018).



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### VENUE

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