凝縮系物理学ゼミナール

日時：7月 29日 （水）13：30～

場所：理学部5号館　413号室

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「Strongly Correlated Quantum Dots Out of Equilibrium: Quantum Simulation using Imaginary-time Formulation」

Study of strong correlation physics out of equilibrium has become one of the most exciting fields in condensed matter theory. The physical systems of interest include quantum dots displaying the zero-bias-anomaly (ZBA) due to Kondo phenomena in quantum dots. In the recent years, significant progress has been made in the strong-correlation community toward deeper understanding of nonequilibrium many-body state of nanoscale electronic devices under finite source-drain bias. Recently, author has formulated an imaginary-time theory of steady-state nonequilibrium, which extends the equilibrium theory into nonequilibrium by introducing complex chemical potentials. Due to its similarity to the equilibrium theory, this formalism becomes very powerful when combined with equilibrium tools such as quantum Monte Carlo method.

As an application, we study molecular junctions where the ZBA is accompanied with inelastic conductance peaks at finite source-drain bias, possibly due to the electron coupling to molecular vibration. We discuss the theoretical puzzles regarding such systems and go over possible minimal models which may produce the Kondo anomaly and inelastic co-tunneling via molecular vibrations.