

物理科学与工程学院声子学与热能科学中心

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时间: 9月18日 (周一), 下午2:00-3:00

地点: 南校区第一实验楼423会议室

**An open quantum system generalization of a 1D quasiperiodic system with a single-particle mobility edge****摘要:**

We investigate and map out the non-equilibrium phase diagram of a generalization of the well known Aubry-Andre-Harper (AAH) model. This generalized AAH (GAAH) model is known to have a single-particle mobility edge which also has an additional self-dual property akin to that of the critical point of AAH model. By calculating the imbalance, we get hints of a rich phase diagram. We also find a fascinating connection between single particle wavefunctions near the mobility edge of GAAH model and the wavefunctions of the critical AAH model. By placing this model far-from-equilibrium with the aid of two baths, we investigate the open system transport via system size scaling of non-equilibrium steady state (NESS) current, calculated by fully exact non-equilibrium Green's function (NEGF) formalism. The critical point of the AAH model now generalizes to a 'critical' line separating regions of ballistic and localized transport. Like the critical point of AAH model, current scales sub-diffusively with system size on the 'critical' line ($\sim N^{-2 \pm 0.1}$). However, remarkably, the scaling exponent on this line is distinctly different from that obtained for the critical AAH model (where $\sim N^{-1.4 \pm 0.05}$). All these results can be understood from the above-mentioned connection between states near mobility edge of GAAH model and those of critical AAH model. A very interesting high temperature non-equilibrium phase diagram of the GAAH model emerges from our calculations.

个人简介:

Prof. Manas Kulkarni obtained Ph. D in State University of New York at Stony Brook, USA. He was later a post-doc fellow in University of Toronto, and Princeton University. He was appointed as Assistant Professor of Physics (Tenure-Track), City University of New York, USA during 2014-2016. In 2016 he joined ICTS, Tata institute in Bangalore India where he is a full professor.

