Tata Institute of Fundamental Research
Survey No. 36/P, Gopanpally Village, Serilingampally, Ranga Reddy Dist., Hyderabad – 500 046

Webinar

Classical simulation of quantum devices

Archak Purkayastha

Aarhus University, Denmark

Steady miniaturisation of electronic circuits have played a distinctive role in development of modern technology. Due to this miniaturisation, current cutting-edge technology is on the threshold of encroaching upon length scales where quantum effects are important, requiring the advent of quantum technologies for further progress. In such nanoscale systems, dissipative effects due to the surrounding environment cannot be neglected. This has led to the advent of noisy quantum devices on various platforms such as superconducting circuits, molecular junctions, nitrogen-vacancy (NV) centers in diamond etc. Fundamentally, such devices work by taking the system out-of-equilibrium by applying a drive, for example, a voltage bias. Though there has been tremendous experimental progress in this direction, most existing theoretical tools for describing such driven dissipative quantum many-body systems are limited to extremely restrictive cases. This severely limits our understanding of already experimentally realisable situations. It is therefore imperative to develop numerical techniques which allow simulation of such systems over a wide range of parameters beyond present limitations. In this talk, I will present a recently developed approach which goes towards achieving this goal.

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