

PRISMA+ Colloquium

Nov. 9, 2022 at 1 p.m.
Lorentz-Raum, 05-127, Staudingerweg 7

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Quantum Simulation of Collective Neutrino Oscillations

In extreme astrophysical environments like supernova explosions, the large neutrino density can lead to collective flavor oscillations driven by neutrino-neutrino interactions. These phenomena are important to describe flavor transport and have potentially important consequences for both the explosion mechanism and nucleosynthesis in the ejected material. Even simple models of neutrino-neutrino interactions require the solution of a challenging many-body problem whose exact solution requires exponential resources in general. In this talk the referent will describe the physics of collective flavor oscillations and present the recent efforts to simulate the real-time flavor dynamics of two-flavor neutrinos using current generation quantum computers based on both superconducting qubits as well as trapped ions.