

Triangular Bose-Hubbard trimer as a minimal model for a superfluid circuit

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The triangular Bose-Hubbard trimer is topologically the minimal model for a BEC superfluid circuit. As a dynamical system of two coupled freedoms it has mixed phase-space with chaotic dynamics. We [1] employ a semiclassical perspective to study triangular trimer physics beyond the conventional picture of the superfluid-to-insulator transition. From the analysis of the Peierls-Nabarro energy landscape, we deduce the various regimes in the (ω, u) parameter-space, where u is the interaction, and ω is the superfluid rotation-velocity. We thus characterize the superfluid-stability and chaoticity of the many-body eigenstates throughout the Hilbert space.

[1] Geva Arwas, Amichay Vardi, Doron Cohen, arXiv:1308.5860