Physical Sciences Seminar

Adiabatic and superadiabatic processes with a superconducting circuit

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Host: Johannes Fink / Alfredo Rueda

The adiabatic theorem (Born and Fock, 1928) is a very powerful result in quantum physics. I will present a few results that demonstrate the stimulated Raman adiabatic passage (STIRAP) in a three-level artificial atom (a superconducting transmon circuit) as well as the realization of superadiabatic processes on the same experimental platform. In the case of superadiabatic STIRAP (saSTIRAP) I will show the correspondence with a three-spin lattice system, how the counteradiabatic drive produces Peierls couplings, and how the evolution of the system can be controlled by a synthetic gauge-invariant phase. Finally, I will present the Majorana star representation of these protocols. References: KS Kumar, A Vepslinen, S Danilin, GS Paraoanu, Stimulated Raman adiabatic passage in a three-level superconducting circuit, Nature communications 7, 10628 (2016)S Danilin, A Vepslinen, GS Paraoanu, Experimental state control by fast non-Abelian holonomic gates with a superconducting qutrit, Physica Scripta 93 (5), 055101 (2018)A Vepslinen, S Danilin, GS Paraoanu, Optimal superadiabatic population transfer and gates by dynamical phase corrections, Quantum Science and Technology 3 (2), 024006 (2018)A Vepslinen, S Danilin, GS Paraoanu, Superadiabatic population transfer in a three-level superconducting circuit, Science advances 5 (2), eaau5999 (2019)

Wednesday, January 29, 2020 03:00pm - 04:00pm
Foyer seminar room Ground floor / Office Bldg West (I21.EG.128)

This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station. Please find a schedule of the ISTA Shuttle on our webpage: https://ista.ac.at/en/campus/how-to-get-here/ The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.