



Physical Sciences Seminar

From Superconducting Circuits to Topological Insulator Floquet Modes: Singal Amplification and Generating Entanglement

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Host: Johannes Fink

My talk will cover the use of nonlinearity in quantum optics to design quantum-limited amplifiers or generate entanglement. In the first part, I will discuss a new design for microwave degenerate parametric amplifiers (DPAs) that uses kinetic inductance to overcome limitations caused by high-order nonlinearities from Josephson junctions. The resulting DPA exhibits phase-sensitive gains of up to 40 dB, operating close to the quantum noise limit, and provides new opportunities for sensitive microwave measurements. In the second part of my talk, I will discuss entanglement generation in silicon-based Topologically insulate Floquet defect mode resonance (FDMR) systems. Our study leverages a resonance effect in the bulk of an FDMR to demonstrate enhanced entangled photon pair generation. We achieve second-order cross correlation of photon pairs 300 times higher than without resonance, thanks to a wavelength-tunable FDMR with Q-factors up to 10^5 and FSR ~ 5 nm. Our results provide new insights into generating and manipulating entanglement in quantum systems, which has important implications for quantum communication and computation.

Tuesday, May 16, 2023 01:00pm - 02:00pm

Office Bldg West / Ground floor / Heinzl Seminar Room (I21.EG.101)



This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station.

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<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.