

cQED@Tn - "Circuit QED: From Quantum Devices to Analogues on Superconducting Circuits"



Contribution ID: 27

Type: ORAL

A preliminary study of Traveling-wave Josephson parametric amplifiers (TWJPA)

Wednesday, 5 October 2022 12:00 (30 minutes)

The growing interest in quantum technologies, from fundamental physics experiments to quantum computing, demands for extreme performance and quantum-limited electronics. Superconducting microwave amplifiers, due to their dissipationless nature, exhibit outstanding performances in terms of noise (quantum limited), and gain. However, bandwidth and saturation power still show space for substantial improvement. Within the DARTWARS Project (<https://dartwars.unimib.it/>), funded by Italian Institute of Nuclear Physics (INFN), the characterization of the performances of traveling-wave Josephson parametric amplifiers (TWJPA) have been studied at 300 mK. This is a device able to provide parametric amplification through a metamaterial composed by coplanar waveguides embedding several Josephson junctions (JJs), taking advantage of the properties of these nondissipative and nonlinear superconducting components.

The characterization of this device at 300 mK aims to evidence the main aspects of their performances. It represents a quick and relatively inexpensive way to test these superconductive devices that can be of helpful to improve the design and fabrication of the TWJPA.

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Session Classification: Talks