

A SNAIL Travelling Wave Parametric Amplifier

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I will present the experimental demonstration of a novel Travelling Wave Parametric Amplifier (TWPA) composed of an array of superconducting nonlinear asymmetric inductive elements (SNAILs). The asymmetry in the SNAILs allows to change the sign of the Kerr non-linearity by tuning an external magnetic flux. We demonstrate the use of Kerr sign reversal to obtain the phase matching condition for four wave mixing amplification without any transmission (gap) engineering. The absence of gaps in the device transmission reduces gain ripples and allows in situ tunability of the amplification band by changing the pump frequency. We achieve near quantum limited amplification with up to 4 GHz bandwidth and -98 dBm saturation at 20 dB gain.