

Abstract Submitted  
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**Nonlinear coupling of nano mechanical resonators to Josephson quantum circuits** XINGXIANG ZHOU, ARI MIZEL, The Pennsylvania State University — We study a technique to couple the position operator of a nano mechanical resonator to a SQUID device by modulating its magnetic flux bias. By tuning the magnetic field properly, either linear or quadratic couplings can be realized, with a discretely adjustable coupling strength. This allows us to realize nonlinear dynamics on the nano mechanical resonator by coupling it to a Josephson quantum circuits. As an example we show how squeezing of the nano mechanical resonator can be realized with this technique. We also propose a simple method to measure the uncertainty in the position of the nano mechanical resonator without quantum state tomography.

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