

Abstract Submitted  
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**Detection of oscillator-qubit entanglement in nanomechanical systems**<sup>1</sup> KJETIL BORKJE, THOMAS SCHMIDT, Yale University, BJOERN TRAUZETTEL, University of Wuerzburg, Germany, CHRISTOPH BRUDER, University of Basel, Switzerland — In recent years, various proposals have been made on how to create entanglement between a quantum oscillator and a qubit. We propose a nanoelectromechanical device which would allow the detection of such entanglement by coupling the oscillator and the qubit to a quantum point contact. We demonstrate that measurements of the current and the symmetrized current noise of the quantum point contact reveal information about a bipartite expectation value matrix of the oscillator-qubit system. This matrix allows the evaluation of a specific entanglement witness. This proposal is a step towards the detection of entanglement between a discrete and a continuous variable in nanomechanical systems.

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