

Abstract Submitted
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Observation of Lamb shift in an artificial atom caused by coupling to the phonon vacuum THOMAS AREF, MARIA EKSTRÖM, Chalmers University of Technology, MARTIN GUSTAFSSON, Columbia University, ANTON KOCKUM, RIKEN, ANDREAS ASK, GÖRAN JOHANSSON, PER DELSING, Chalmers University of Technology — Recently, it has been shown that surface acoustic waves (SAWs) can be coupled to an artificial atom in the form of a transmon qubit. We have experimentally measured the response of such an artificial atom placed on a piezoelectric lithium niobate substrate. The artificial atom has an interdigitated capacitance which gives multiple coupling points to SAW resulting in a strong frequency dependent coupling to the phononic vacuum. This coupling results in a non-monotonic Lamb shift due to causality, via the Kramers-Kronig relation. We observe a frequency dependent Lamb shift and corresponding coupling variation which agree well with theory.

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