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**Diamond mechanical resonators for strain coupling to nitrogen-vacancy centers** PREETI OVARTCHAIYAPONG, LAETITIA PASCAL, KENNETH LEE, BRYAN MYERS, ANIA BLESZYNSKI JAYICH, University of California Santa Barbara — The nitrogen-vacancy (NV) center in diamond is promising for applications in quantum information and quantum assisted sensing. We have fabricated NV-containing single-crystal diamond mechanical resonators that exhibit high quality factors in excess of 300,000. These structures provide a highly controlled platform for investigating the effect of strain on the NV. The strain is calculated from the mode shape of a driven resonator and we correlate the strain to the measured energy level shift. Understanding the strain coupling is an important step toward NV center spin manipulation using local strain fields as an alternative to external magnetic and electric fields. Furthermore, such a mechanical-spin interface could enable mechanical control of spin states as well as provide a hybrid approach to a scalable quantum network.

Preeti Ovartchaiyapong
University of California Santa Barbara

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