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Diamond crystal stress imaging using nitrogen-vacancy centers in diamond PAULI KEHAYIAS, Sandia National Laboratories, MATTHEW TURNER, DAVID GLENN, CONNOR HART, Harvard University, JENNIFER SCHLOSS, Massachusetts Institute of Technology, RAISA TRUBKO, Harvard University, MARIE WESSON, University of Chicago, RONALD WALSWORTH, Harvard University — We will present our work using nitrogen-vacancy (NV) defect centers in diamond to optically image the crystal stress tensor elements of a diamond sample. Motivated by our ongoing progress using 2D layers of NV centers for magnetic microscopy in geology and biology, we will discuss how strain defects in a diamond crystal can spoil the magnetic sensitivity and give rise to false magnetic features. We will describe our technique for reconstructing the diamond stress tensor from optically-interrogated NV resonance frequencies, validate and compare with measurements from a built-in birefringence imager, catalog the types of strain features common to our synthetic diamond chips, and discuss how this work enables improved NV magnetic and stress sensing.

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