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**Imaging strain gradients inside a diamond anvil cell using Nitrogen-Vacancy Centers in Diamond** SATCHER HSIEH, THOMAS MITTIGA, CHONG ZU, Department of Physics, University of California, Berkeley, CA 94720, USA, THOMAS SMART, Department of Earth and Planetary Science, University of California, Berkeley, CA 94720, USA, BRYCE KOBRIN, Department of Physics, University of California, Berkeley, CA 94720, USA, VIKTOR STRUZHKIN, Geophysical Laboratory, Carnegie Institution of Washington, Washington DC 20015, USA, RAYMOND JEANLOZ, Department of Earth and Planetary Science, University of California, Berkeley, CA 94720, USA, NORMAN YAO, Department of Physics, University of California, Berkeley, CA 94720, USA — Since their introduction, diamond anvil cells have become the most versatile approach to generating sustained high pressures inside the laboratory. By compressing a thin sample between two opposing diamonds, pressures over hundreds of gigapascal can be achieved. Despite their ubiquity, little is known about the internal mechanical response of the diamond anvil at such high pressures. By imaging ensembles of nitrogen-vacancy centers, we perform experimental measurements of strain gradients over a millimeter-size volume under gigapascal pressures. Our results inform the optimization of high pressure cell designs and demonstrate the integration of nitrogen-vacancy centers as atomic scale sensors in high pressure research.

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