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**Imaging Dynamics of Carbon Atoms in a Graphene Sheet** ALEX ZETTL, ÇAĞLAR GIRIT, JANNIK MEYER, Department of Physics, University of California, Berkeley and Materials Sciences Division, Lawrence Berkeley National Laboratory, ROLF ERNI, MARTA ROSSELL, CHRISTIAN KISIELOWSKI, National Center for Electron Microscopy, Lawrence Berkeley National Laboratory, LI YANG, CHEOL-HWAN PARK, MICHAEL CROMMIE, MARVIN COHEN, STEVEN LOUIE, Department of Physics, University of California, Berkeley and Materials Sciences Division, Lawrence Berkeley National Laboratory — Using a transmission electron aberration-corrected microscope capable of simultaneous atomic spatial resolution and 1-second temporal resolution, we record the dynamics of carbon atoms surrounding a hole in a suspended, graphene sheet. As the hole grows, bonds rearrange and atoms are ejected by the electron beam. We study the mechanism of edge reconstruction and demonstrate the stability of the “zigzag” edge configuration both theoretically and by image analysis of the data. We discuss other phenomena from the movie such as pentaheptite edge reconstruction and defect-induced strain.

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