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Two-Dimensional Quasiperiodic Nanomaterials YI- TING CHEN, DOMINIK RASTAWICKI, YAN SUN, YANG LIU, HARI C. MANOHARAN, Department of Physics, Stanford University — We present experiments on quasiperiodic nanostructures, assembled with scanning tunneling microscopy atom-manipulation techniques, studying the physical and electronic effects of incommensurate non-crystalline potentials on crystalline two-dimensional surfaces. Some of the resulting nanomaterials can be envisioned as extensions of quasicrystals, which have long range order but lack translational symmetry. Interest in quasiperiodic materials stems from their fascinating physical and mathematical structure and distinctive mechanical properties, which have motivated research within both hard and soft matter communities. Yet, many of the most notable features in quasiperiodic electronic structure remain unexplored. We will show new materials which extend beyond known quasicrystals by highlighting how electrons organize in two dimensions within incommensurate potentials, assembled using techniques first used for periodic non-strained and non-periodic strained molecular graphene[1]. Imaging, conductance, interference, and correlation measurements reveal unique quasi-band structures emerging from the special topology of quasiperiodic matter.

[1] *Nature* **483**, 306 (2012); *Nature Nanotechnology* **8**, 625 (2013).

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