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On demand angle control in van der Waals heterostructures REBECA RIBEIRO-PALAU, TARUN CHARI, Columbia University, KENJI WATANABE, TAKASHI TANIGUCHI, Japan National Institute for Materials Science, JAMES HONE, KENNETH SHEPARD, CORY RAYMOND DEAN, Columbia University — Fabricating layered heterostructures from the assembly of layered 2D crystals (so called, van der Waals (vdW) materials) has emerged as a new paradigm in nano-structured materials. One intriguing feature of these hybrid systems is that device characteristics often depend critically on the relative crystallographic orientation between adjacent layers. Experimental studies of these effects however have remained significantly constrained, owing to the inability to precisely control the rotation order. Here we present a new device architecture where the crystallographic alignment between layers can be manipulated in situ, while characterizing the electronic response. Variation in the rotational orientation to better than 0.5 degree is demonstrated, enabling for the first time a systematic experimental exploration in twisted layered structures. The angular dependence in a number of interesting van der Waals heterostructures will be discussed.

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