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Strain superlattices in graphene[1] YINGJIE ZHANG, YOUNGSEOK KIM, JOSEPH LYDING, MATTHEW GILBERT, NADYA MASON, Univ of Illinois - Urbana — Superlattices have been widely explored to tailor the electronic properties of two-dimensional electron systems. Previous approaches to create superlattices have been limited to periodic potential modulations, either in the form of electrostatic gating or moiré heterostructures. Here we present a new strategy to generate superlattices in 2D materials. We deposit these 2D membranes on a periodic array of dielectric nanospheres, and achieve superlattices with periodic strain modulations. We studied the electronic and magneto-transport properties of strained graphene superlattices, and observed salient features of Dirac point cloning and Hofstadter's butterfly. Furthermore, we were able to tune the transport properties by changing the magnitude of strain in the graphene superlattice. This new degree of freedom provides a novel platform both for fundamental studies of 2D electron correlations and for prospective applications in 2D electronic devices.

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