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# Engineering Quantum Fabrics with Arbitrary Periodicities

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Quantum fabrics are artificially created materials that offer novel electronic, magnetic, or topological functionalities that do not exist in bulk and could play an important role in future quantum technologies. One method to make them is the assembly of layered two-dimensional van der Waals materials. The stacked layers exhibit moiré superlattices that are tunable by the assembly process allowing arbitrary periodicities to be achieved by rotating the alignment between the layers. This approach provides a versatile platform for engineering and investigating new quantum states of matter.

Here, members of **PARADIM's in-house research team** combine transition metal dichalcogenides sheets and graphene into bilayer and trilayer stacks. Combining **angle-resolved photoelectron spectroscopy (ARPES) and advanced theoretical calculations** the team investigated moiré superlattices over a wide range of energies and momenta commonly accessible by optical or transport probes.

The experiments reveal microscopic structures of moiré superlattices and that moiré superlattice effects are richer than previously known, motivating a new understanding of the mechanism by which these moiré potentials are formed. In addition, the work shows that the capping graphene layer can be imprinted with strong potentials of controllable wavelengths from the underlying moiré superlattice.

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