

Webinar

Ultracold quantum simulators with focus on twistronics

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Groundbreaking experiments with ultracold atom based quantum simulators are providing versions of quantum computers, albeit non-universal ones, which enable one to manipulate certain quantum many-body systems in a very accurate and controlled way, and are thus paving the way for future technologies. In this talk, we will propose a highly tunable scheme to synthetically emulate twisted bi-layer systems, which are endowed with fascinating strong correlations effects, with ultracold atoms trapped in an optical lattice. In our scheme, neither a physical bilayer nor twist is directly realized. Instead, two synthetic layers are produced exploiting coherently-coupled internal atomic states, and a supercell structure is generated via a spatially-dependent Raman coupling. Our proposal opens the route towards the controlled study of strongly-correlated flat-band physics.

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