

# Moiré superlattices formed through a monolayer spacer

**Ben Fuller**

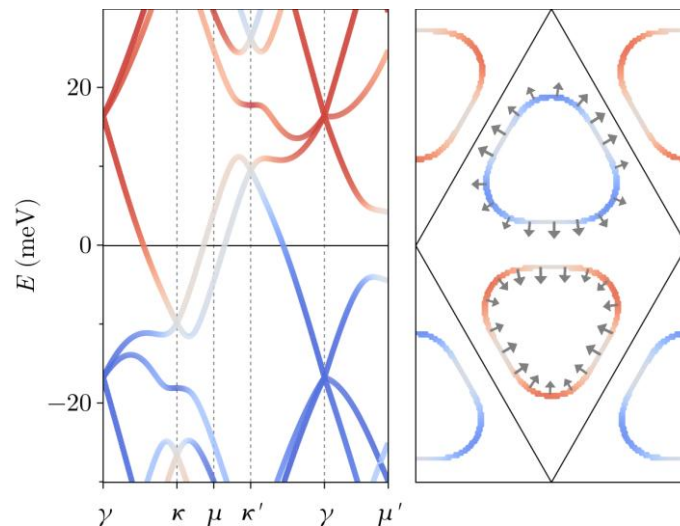
Prof. Vladimir Fal'ko

National Graphene Institute, University of Manchester, Oxford Road, Manchester, M13 9PL, UK

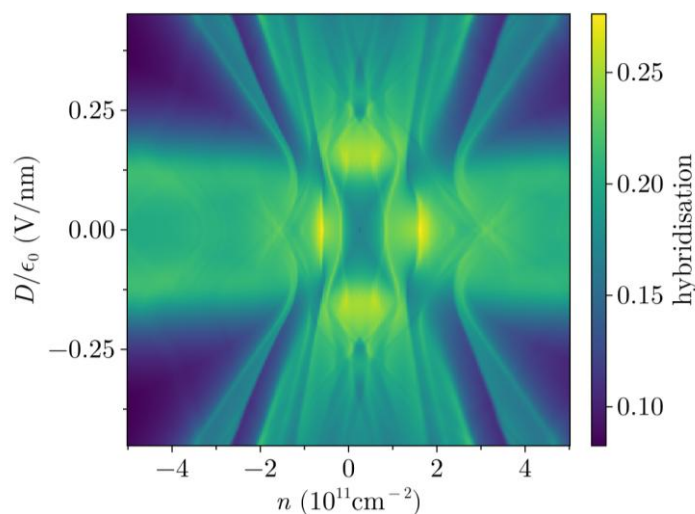
[benjamin.fuller@manchester.ac.uk](mailto:benjamin.fuller@manchester.ac.uk)

Twisted graphene layers even separated by an atomically thin spacer exhibit prominent moiré physics. Tunnelling through or via the spacer gives weaker interlayer coupling compared to directly contacting layers, which enables efficient tuning of the band structure and layer hybridization by modest displacement fields. Recent experiments show that the spacer also suppresses atomic reconstruction of the twisted layers, permitting ultra-small twist angles. Misaligned graphene and hexagonal boron nitride (hBN) are both considered as spacers between graphene monolayers or bilayers. These results establish a class of superlattices with highly tunable properties.

Figures



**Figure 1:** Dispersion (left) and Fermi contour (right) for a  $\theta = 0.18^\circ$  twisted bilayer graphene with a graphene spacer device, with external displacement field  $D/\epsilon_0 = 0.11$  V/nm. Colour red/blue refers to the fraction of carriers localised on the top/bottom layer.



**Figure 2:** hybridisation between the outer layers of a  $\theta = 0.18^\circ$  twisted bilayer graphene with a graphene spacer device, showing a band of enhanced hybridisation which is turned off by a displacement field.