

Graphene Reincarnated: Next-Generation Electronic Quality

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The basic properties of graphene were largely understood within just a few years of its emergence in 2004. Yet the field has repeatedly defied stagnation, reincarnating itself through a succession of major experimental advances: from early “dirty” graphene to a vast family of 2D crystals; from hBN-encapsulated devices to superlattices and van der Waals heterostructures; from electron hydrodynamics to twistrionics and heavy-fermion physics -- alongside a growing range of many-body phenomena made accessible by ever-cleaner, higher-quality devices.

Is the field finally approaching its limits? In this talk, I will argue that graphene is far from exhausted. I will describe how its electronic quality can be improved by up to two orders of magnitude beyond today’s best encapsulated devices through a transformative yet experimentally straightforward approach. Such an advance should provide a new platform for exploring quantum condensed matter physics and, with some luck, reincarnate the graphene field once again.