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Graphene: Deep physics from the all-surface material

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The 2010 Nobel Prize in Physics was awarded to Andre Geim and Kostya Novoselov for their experiments on graphene, a single-atom plane of graphite. I will discuss why graphene has generated such excitement in condensed matter physics. Graphene is different: graphene's electrons mimic massless Dirac Fermions. But graphene is also amazingly tunable: Bandgaps can be generated by nanostructuring. Interactions can be tuned by the surrounding dielectric. Strain generates effective "pseudomagnetic" fields up to 300 Tesla. The work function can be tuned over a large range. Such tunability promises that graphene will remain interesting as a laboratory for condensed matter physics.