Electron-electron interactions in artificial graphene
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Recent advances in the creation and modulation of graphenelike systems are introducing a science of “designer Dirac materials.” In its original definition, artificial graphene is a man-made nanostructure that consists of identical potential wells (quantum dots) arranged in an adjustable honeycomb lattice in the two-dimensional electron gas. As our ability to control the quality of artificial graphene samples improves, so grows the need for an accurate theory of its electronic properties, including the effects of electron-electron interactions. Here we determine those effects on the band structure and on the emergence of Dirac points, and discuss future investigations and challenges in this field.