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Electrons in Flatland[1]

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Like the classical squares and triangles in Edwin Abbott's 19th century social satire and science fiction novel *Flatland*, electrons and other quantum particles behave differently when confined to a two-dimensional world. Condensed matter physicists have been intrigued and regularly suprised by two-dimensional electron systems since they were first studied in semiconductor field-effect-transistor devices over forty years ago. I will discuss some important milestones in the study of two-dimensional electrn systems, from the discoveries of the integer and fractional quantum Hall effects in the 1980's to recent quantum Hall effect work on quasiparticles with non-Abelian quantum statistics. Special attention will be given to a new electronic *Flatland* that has risen to prominence recently, graphene, which consists of a single sheet of carbon atoms in a honeycomb lattice arrangement. Graphene provides a realization of two-dimensional massless Dirac fermions which interact via nearly instantaneous Coulomb interactions. Early research on graphene has demonstrated yet again that *Flatland* exceeds expectations.

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