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Tunable magnetism at graphene edges MANUEL SCHMIDT, RWTH Aachen, Institute for Theoretical Solid State Physics — Electron-electron interactions drive clean graphene zigzag edges to a ferromagnetic state, known as edge magnetism. In this state, the spin of specific one-dimensional electronic modes, that are localized at the edge (the so-called edge state), is fully polarized. I will discuss a mechanism by which the edge magnetism can be manipulated via electric fields. One possible realization of this mechanism is based on graphene/graphane interfaces. As the field strength is varied, the graphene edge undergoes two phase transitions: (1) from fully polarized edge magnetism to a ferromagnetic Luttinger liquid (fLL) and (2) from the fLL to an ordinary Luttinger liquid. The intermediate phase (fLL) is a realization of the unusual itinerant one-dimensional ferromagnet and is therefore in seeming contradiction with the Lieb-Mattis theorem, which forbids such one-dimensional magnetism. The resolution of this seeming contradiction is shortly discussed.

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