

Abstract Submitted
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Insulating state of a graphene edge in the spin-polarized quantum Hall effect regime¹ MAXIM KHARITONOV, Materials Science Division, Argonne National Laboratory — The edge of an undoped graphene in the quantum Hall effect regime that supports spin-polarized bulk and gapless counter-propagating edge states is studied using one-dimensional bosonization technique. The attractive long-range Coulomb interactions between electron and hole modes result in a strong tendency towards excitonic pairing with the associated spin-density wave structure. In the absence of backscattering, however, the edge excitations remains gapless, no order is formed, and the edge remains metallic. Backscattering on random spin-orbital defects that involves spin flips leads to the localization of the edge states. The localization effects can be significantly enhanced by the Coulomb interactions.

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