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Two dimensional massless Dirac fermions with Coulomb interaction and random gauge potential SEN ZHOU, OSKAR VAFEK, Florida State University — We present a numerical study of the two dimensional massless Dirac fermions of monolayer graphene with long-range Coulomb interaction and random gauge potential. The Coulomb interaction renormalizes logarithmically the electron velocity at low energies, leading to a decrease in the density of states. While the density of states is enhanced by the random gauge potential, and has a power-law dependence in low energies, $\rho(E) \sim E^{-1+2/z}$ with $z = 1+\sqrt{3}\Delta/\pi$, where Δ measures the disorder strength. The combined effect of interaction and disorder gives rise to a line of fixed points where both the interaction and disorder are finite, and the low-energy density of states is exactly linear. Results are consistent with previous renormalization group argument.

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