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**Localization properties of graphene Landau levels: The role of edge states** DANIEL SOLIS, Instituto de Fsica IFGW, Universidade Estadual de Campinas, CARLOS PAEZ, PETER SCHULZ, ANA PEREIRA, Faculdade de Cincias Aplicadas FCA, Universidade Estadual de Campinas, Limeira — The observation of the quantum Hall effect for graphene in 2005 represented an important landmark, proving the genuine two-dimensional nature of graphene. Here we use a tight-binding approach to investigate the localization properties of quantum Hall edge states of graphene flakes with sharp edges. In order to identify which wave function is concentrated in the edges, or distributed in the bulk, we defined a quantity named "Edge Fraction",indicating the fraction of electronic probability densities over the atomic sites at distances from the edges limited to twice the magnetic length lB. We also calculate separately the fraction of the wave function amplitude over zigzag or armchair edges, observing an interesting and clear pattern for different energies between consecutive Landau levels. The edge states are manifested in the presence of states among the Landau levels. Here was explored the interplay of different square lattices sizes and disorder in the localization properties of the system. We observed that size variation do not affect the behavior of the Edge Fraction. Also it was found that exist a dependence between the behavior of the Edge Fraction for the armchair and zigzag contribution with respect to disorder.

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