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Snake states and Majorana's in graphene quantum dots in the presence of a p-n junction FRANCOIS PEETERS, M. ZARENIA, Universiteit Antwerpen, Dept. Physics, J.M. PEREIRA, JR., G.A. FARIAS, UFC, Dept. de Fisica, Fortaleza, Ceara, Brazil — We investigate the magnetic interface states of graphene quantum dots that contain p-n junctions. Within a tight-binding approach, we consider rectangular quantum dots in the presence of a perpendicular magnetic field containing p-n, as well as p-n-p and n-p-n junctions. The results show the interplay between the edge states associated with the zigzag terminations of the sample and the snake states that arise at the p-n junction, due to the overlap between electron and hole states at the potential interface. Remarkable localized states are found at the crossing of the p-n junction with the zigzag edge having a dumb-bell shaped electron distribution. These states are localized Majorana states. The results are presented as function of the junction parameters and the applied magnetic flux.

Francois Peeters
Universiteit Antwerpen, Dept. Physics

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