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Confined States and Tunnelling in Gated Graphene Nanoribbons[1]

E, GUILLEMINOT, Universidad de las Américas Puebla, Mexico, L. MEZA-MONTES, Instituto de Física BUAP, Mexico — Graphene Quantum Dots (GQDs) are promising candidates for the development of quantum information processors. We propose a scheme to determine electronic states of GQDs as defined by voltage gates applied to armchair graphene nanoribbons. Using transfer matrix method based on the set of solutions proposed by Burkard *et al.* [1], we study confined states of double wells and the transmission of electrons through double barrier systems. Comparison with previous results for systems on the graphene sheet shows good agreement. Confined states of a double well turn out to be very sensitive to deformation of the potential profile, showing strong localization of the electron for asymmetric systems, which also depends on the considered state. Spikes of high transmission appeared for periodic values of the incident angle of the electron travelling through a double barrier and disappear as the systems approaches to a single barrier as one barrier vanishes. We remark effects not shown in usual semiconductor heterostructures.

[1] B. Trauzettel *et al.*, Nature Physics 3, 192 (2007).

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Lilia Meza-Montes
Instituto de Fisica BUAP

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