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Tunneling in double quantum dots and rings: search for chaos assistance[1] IGOR FILIKHIN, SERGEI MATINYAN, BRANISLAV VLAHOVIC, North Carolina Central University — Semiconductor heterostructures as quantum dots (QD) or quantum rings (QR) demonstrate discreet atom-like energy level structure. In the case of double QD (DQD) or double concentric QR (DCQR), a single electron spectrum is composed of a set of quasi-doublets [1]. We study influence of these specific spectrum properties on electron tunneling related to the electron transport through DQD (DCQR). The double InAs/GaAs quantum dots (rings) are considered within three dimensional single sub-band effective approach [2]. Tunneling between dots (rings) is evaluated by effect of inter-dot distance and QD (QR) geometry. We show that the quasi-doublets of the electron spectra define tunneling properties of the DCQR. Violation of symmetry of the DCQR geometry leads to increase of tunneling. Discussed will be also the chaos assisted tunneling in the double QD (DCQR).

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[2] I. Filikhin, V. M. Suslov and B. Vlahovic, Phys. Rev. B 73, 205332 (2006).

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Igor Filikhin
North Carolina Central University

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