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Graphene zigzag ribbons, square lattice models and quantum spin chains MAHDI ZAREA, NANCY SANDLER, Ohio University — In our previous work, based on the exact solutions of tight-binding model of zigzag graphene ribbons (ZGRs), we suggested a new description of ZGRs in terms of coupled quantum chains. Treating ZGRs as coupled quantum chains reveals a close connection between the low energy properties of the ZGR model and a continuous family of square lattice model Hamiltonians with similar width-dependent properties, that includes the π -flux and the trivial square lattice models. We use this mapping between ZGRs Hamiltonian and these models to study the effect of higher order hopping terms of the tight-binding model and spin-orbit interactions in graphene ribbons. [1]

[1] M. Zarea and N. Sandler, New Journal of Physics 11 (2009) 095014

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