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Band-Gap Renormalization in Quantum Wires

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Abstract: Improved techniques in semiconductor fabrication increased the interest in quantum wire structures, because of their opto-electronic device application possibilities. Many-body interactions among the electrons and holes in the wire lead to the band-gap renormalization (BGR), which in turn affect the optical properties of the system. We study the BGR within the random-phase approximation incorporating the dynamical effects, and investigate the density dependence.

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