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Short-range Correlations in Coupled Quantum-wire Systems

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Abstract: We study the contact values of the inter-wire pair-correlation function in electron-electron and electron-hole double-wire systems. For this purpose the ladder approximation as generalized to multicomponent systems is used. The ladder approximation yields positive values for the inter-wire $g_{ee}(0)$ and $g_{eh}(0)$ for all values of the density parameter r_s and distance d between the wires. This allows us to infer possible instabilities in the system more reliably compared to other approaches. We also investigate the effects of quantum-wire width and screening on the inter-wire pair-correlation functions.
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