High degree of current rectification at nanoscale level

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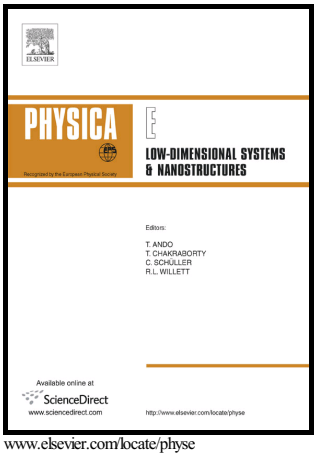

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High degree of current rectification at nanoscale level

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Abstract

We address an unexpectedly large rectification using a simple quantum wire with correlated site potentials. The external electric field, associated with voltage bias, leads to unequal charge currents for two different polarities of external bias and this effect is further enhanced by incorporating the asymmetry in wire-to-electrode coupling. Our calculations suggest that in some cases almost cent percent rectification is obtained for a wide bias window. This performance is valid against disorder configurations and thus we can expect an experimental verification of our theoretical analysis in near future.

Keywords: Nanoscale rectifier; High rectification ratio; Disordered quantum wire; External electric field; Asymmetric junction coupling.

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