Gate tunable nonlinear rectification effects in three-terminal graphene nanojunctions

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Graphene-based nanostructures have attracted increasing interest in recent years because of their novel electrical, optical, and mechanical properties and potential applications in diverse fields including, e.g., all carbon-based nanoelectronics and optoelectronics [1].

Here, we report on the realization of TTJ devices in graphene and on a study of the size dependence and voltage scaling of the nonlinear charge transport properties of the graphene based TTJ devices. We show that the nonlinear rectification effect of the graphene based TTJ devices can be effectively modulated using a voltage applied to a gate and exhibits a transport carrier polarity dependence. We further show that these nonlinear characteristics could be used to probe electronic structure in graphene nanostructures and the thermopower of grapheme at a nanoscale [2].

Keywords: Graphene, three-terminal junction, ballistic

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