Exact results for intrinsic electronic transport in graphene

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We present exact results for the electronic transport properties of graphene sheets connected to two metallic electrodes. Our results, obtained by transfer-matrix methods, are valid for all sheet widths and lengths. In the limit of large width-to-length ratio relevant to recent experiments, with zigzag interfaces the Dirac-point conductivity is $2e^2/\sqrt{3}h$ and a sub-Poissonian Fano factor of $2 - 3\sqrt{3}/\pi$ is obtained; with armchair interfaces these are respectively 0 and 1. Our results reflect both the intrinsic topology of the sheet and the electronic structure of the electrodes, giving a complete microscopic understanding of the unique transport properties of graphene.