Controlling transport in two-dimensional materials: harnessing substrate effects and light-matter interaction

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Abstract

Since the advent of graphene a miriad of schemes have been devised with the aim of controlling charge [1,2] and valley transport [3], from ways of opening a gap to switch off conduction [1,3] to the clever use of defects as valley filters [4].

Here we put forward two schemes harnessing the combined effect of a tailored substrate and light-matter interaction. Our results show how one can gain accurate control of both valley and charge currents. Although this is exemplified for the case of graphene, the scheme is general and can be used with other two-dimensional materials.

References

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