An electrical analogy to Mie scattering

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Mie scattering is an optical phenomenon that appears when light is elastically scattered at a spherical or cylindrical object. A transfer of this phenomenon onto electron states in ballistic graphene has been proposed theoretically [1], assuming an incident wave scattered by a circular, nano-scaled potential, but experimental fingerprints are lacking.

An experimental demonstration of an electrical analogue to Mie scattering is presented in this poster by using graphene as a conductor, and periodic circular potentials canted with respect to the incident current (Figure 1) [2]. These findings remain at ambient conditions, encouraging the technological development of novel electronic systems based on Dirac-fermions.

References

[1] R.L. Heinisch, et al. Phys. Rev. B 87, 155409 (2013).
[2] J. M. Caridad, et al. Nature Comm. 7, 12894 (2016).

Figures

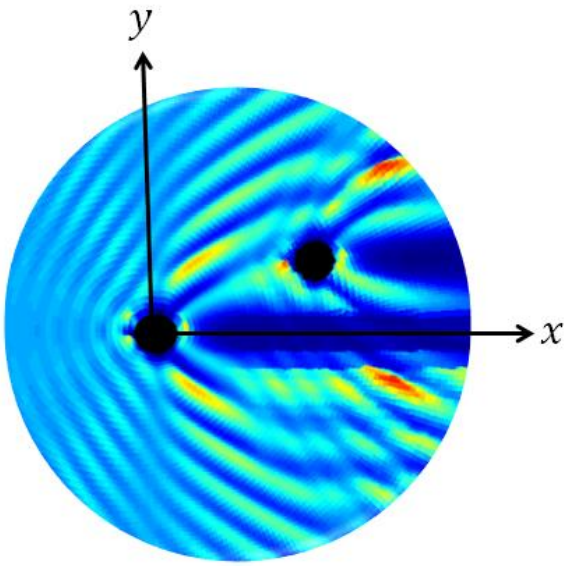

Figure 1: Cascaded Mie scattering. Electron density distribution for cascaded Mie scattering on two canted, circular potentials (black, 100 nm diameter). The electronic wave-function is incident from left along the x axis. An asymmetric redistribution is found, implying the generation of a measurable transverse voltage along the *y* axis [2].