

Strong magneto-photoelectric effect in folded graphene

Ralf Schuetzhold and Friedemann Queisser

*Universität Duisburg-Essen, Fakultät für Physik, Lotharstr. 1, 47048 Duisburg,
Germany*

We study electronic transport in graphene under the influence of a transversal magnetic field $B(x)\mathbf{e}_z$ with the asymptotics $B(x \rightarrow \pm\infty) = \pm B_0$, which could be realized via a folded graphene sheet in a constant magnetic field, for example. By solving the effective Dirac equation, we find robust modes with a finite energy gap which propagate along the fold – where particles and holes move in opposite directions. Exciting these particle-hole pairs with incident (optical or infrared) photons would then generate a nearly perfect charge separation and thus a strong magneto-photoelectric or magneto-thermoelectric effect – even at room temperature.