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**Detecting Topological Currents in Gapped Graphene**[1]

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If a gap is open in a Dirac spectrum, Hall-like currents can flow perpendicular to applied electric field even in the absence of a magnetic field. This is due to non-zero Berry curvature, intrinsic for electronic systems with massive Dirac fermions. In graphene, the Berry curvature forces charge carriers in the two valleys to move in opposite directions, which results in zero net electric current. Nonetheless, if intervalley scattering is weak, valley currents can be detected using the nonlocal geometry. We will overview our observations of strong valley currents in graphene-on-hBN superlattices and biased bilayer graphene.

[1]In collaboration with Artem Mishchenko.