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Tunable energy gap in suspended bilayer graphene MONICA ALLEN, THOMAS WEITZ, JENS MARTIN, BENJAMIN FELDMAN, AMIR YACOBY, Harvard University — Bilayer graphene introduces a layer degree of freedom and provides a rich platform on which to study interaction driven effects that break its eightfold degeneracy (spin, valley, and orbital) [1]. Furthermore, it is possible to introduce a tunable bandgap in the density of states by applying a perpendicular electric field that breaks the inversion symmetry of the layers. The observation of correlated effects, increased mobilities, and this gap depends critically on high sample quality. For example, the electrostatic band gap has been observed optically, but its full observation in transport has been hindered due to disorder. Here we report a first realization of higher sample quality in suspended bilayer graphene devices with suspended top gates. This double-gated geometry allows for independent control of carrier density and electric field. Fabrication of suspended top-gated bilayers as well as our data on the tunable field-induced gap will be discussed. We report a significantly larger increase in peak resistance with electric field than in previous transport experiments.

[1] B.E. Feldman et al, Nature Physics

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