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Electric Field Modulation of Galvanomagnetic Properties of Mesoscopic Graphite YUANBO ZHANG, Dept. of Physics, Columbia University, JOSHUA SMALL, Dept. of Physics, Columbia University, PHILIP KIM, Dept. of Physics, Columbia University — We use a unique micromechanical method to extract extremely thin graphite crystallites from bulk highly oriented pyrolytic graphite samples. Electric field effect devices are subsequently fabricated for galvanomagnetic measurements. Strong modulation of magneto-resistance and Hall resistance as a function of gate voltage is observed as the sample thickness approaches the screening length of graphite. Electric field dependent Landau level formation is detected from Shubnikov de Haas oscillations in magneto-resistance. The effective mass of and hole carriers has been measured from the temperature dependent behavior of these oscillations. Extending similar experimental methods to other layered materials will be discussed.

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