Transport and Capacitance Measurements of Bi$_2$Se$_3$ Devices
VALLA FATEMI, HADAR STEINBERG, FERHAT KATMIS, BENJAMIN M. HUNT, LUCAS ORONA, JAGADEESH S. MOODERA, PABLO JARILLO-HERRERO, MIT — We report electronic transport and capacitance measurements on Bi$_2$Se$_3$ thin-film and exfoliated devices. Strong modulation of the charge carrier density is achieved via the electric field effect with a local top-gate electrode utilizing either high-k dielectric insulators or transferred hexagonal boron nitride. The understanding of ambipolarity due to the electric field effects in these systems is addressed by comparing the modulation of the quantum capacitance and resistance in different devices, accompanied by a model. Additionally, we report capacitance and resistance measurements on these devices at high magnetic fields.

Valla Fatemi
MIT

Date submitted: 26 Oct 2012

Electronic form version 1.4