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Bandgap opening in bilayer graphene at metal contacts RYO NOUCHI, Osaka Prefecture University — A bandgap is opened in bilayer graphene (BLG) by introducing a potential difference between the two graphene layers, raising expectations for its application to a transistor channel. The potential difference can be introduced, for example by charge transfer from surface adsorbates. Thus, a finite bandgap is expected to be opened also at a metal contact, an inevitable component of transistors, where interfacial charge transfer occurs to align the Fermi levels of the metallic electrode and the underlying BLG. The bandgap at the metal-BLG interface can be detected by the superlinear current-voltage characteristics in back-gate field-effect transistors, caused by carriers propagating through the bandgap, i.e., by the band-to-band transport [1]. The superlinearity was higher in the positively-gated region, attributed to hole doping from the Cr/Au electrodes. The control experiments using single-layer graphene (SLG) did not have a superlinearity, which is consistent with the fact that a sizeable bandgap is not expected at the metal-SLG interface. The current transport through the bandgap should be an additional source of electrode-contact resistance. [1] R. Nouchi, Appl. Phys. Lett. 105, 223106 (2014).

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