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Structure, Stability and Electronic Properties of Graphene Edges on Co(0001) DEBORAH PREZZI, S3 CNR-Nano, IT, DAEJIN EOM, Columbia University, NY, KWANG T. RIM, Columbia University, HUI ZHOU, MICHAEL LEFENFELD, COLIN NUCKOLLS, TONY F. HEINZ, GEORGE W. FLYNN, Columbia University, NY, MARK S. HYBERTSEN, Brookhaven National Laboratory, NY — We recently demonstrated the growth of epitaxial graphene flakes on Co(0001) surfaces [1]. Here we combine low-temperature scanning tunneling microscopy (STM) measurements and DFT calculations to study graphene edge stability and electronic properties, as resulting from the coupling with the substrate. Graphene edges display straight well-ordered structure with zigzag orientation. DFT calculations provide insights into their stability by comparing several edge morphologies with both armchair and zigzag orientation. Simulated images indicate that different edge structures can be clearly distinguished in topography at low bias. The calculated electronic properties for the low energy edge structures are consistent with the measured STS tunneling spectra, which show a prominent edge-localized peak at low bias. [1] D. Eom et al., Nano Lett. 9, 2844 (2009).

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