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Topological valley transport at bilayer graphene domain walls LONG JU, ZHIWEN SHI, NITYAN NAIR, YINCHUAN LV, CHENHAO JIN, JAIRO VELASCO JR., CLAUDIA OJEDA-ARISTIZABAL, Univ of California - Berkeley, HANS BECHTEL, MICHAEL MARTIN, Lawrence Berkeley National Lab, ALEX ZETTL, JAMES ANALYTIS, Univ of California - Berkeley, PAUL MCEUEN, Cornell University, FENG WANG, Univ of California - Berkeley — Electron valley, a degree of freedom that is analogous to spin, can lead to novel topological phases in bilayer graphene. An external electric field can induce a tunable bandgap in bilayer graphene, and domain walls between AB- and BA-stacked bilayer graphene can support protected chiral edge states of quantum valley Hall insulators. In this talk, I will present our efforts on revealing the topologically protected edge states at AB-BA domain walls by combining near field infrared nanoscopy with electrical transport measurement. These one-dimensional valley-polarized conducting channels feature a ballistic length of about 400 nanometres at 4 kelvin.

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