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Low Energy Electron Potentiometry RUDOLF M. TROMP, IBM T J Watson Res Ctr, JAAP KAUTZ, JOHANNES JOBST, Leiden University, Kamerlingh Onnes Laboratory, 2300RA Leiden, The Netherlands, CHRISTIAN SORGER, HEIKO B. WEBER, Friedrich Alexander Universitat, Erlangen-Nuernberg, Germany, SENSE JAN VAN DER MOLEN, Leiden University, Kamerlingh Onnes Laboratory, 2300RA Leiden, The Netherlands — Charge transport measurements form an essential tool in condensed matter physics. The usual approach is to contact a sample by two or four probes, measure the resistance and derive the resistivity, assuming homogeneity within the sample. A more thorough understanding, however, requires knowledge of local resistivity variations. Here, we present a new way to determine spatial potential maps of a current-carrying sample, based on low-energy electron microscopy (LEEM). In this surface imaging technique the image intensity depends sensitively on the local electron landing energy. Specifically, we probe the in-plane potential distribution between laterally spaced electrical contacts on a layered quasi-two-dimensional (2D) sample (single to triple layer graphene). We make use of the property that incoming electrons are resonant with interlayer graphene states for well-defined (local) landing energies. Our method is straightforwardly extendable to other quasi-2D systems, most prominently to the upcoming class of layered van der Waals materials.

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