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Imaging coherent transport in a mesoscopic graphene ring DAMIEN CABOSART, SEBASTIEN FANIEL, FREDERICO R. MARTINS, Universite catholique de Louvain (UCL), IMCN/NAPS, BORIS BRUN, Institut Neel et Universite Joseph Fourier, ALEXANDRE FELTEN, Universite de Namur (Unamur), VINCENT BAYOT, BENOIT HACKENS, Universite catholique de Louvain (UCL), IMCN/NAPS — Mesoscopic graphene devices often exhibit complex transport properties, stemming both from the peculiar electronic band structure of graphene, and from the high sensitivity of transport to local disorder in this two-dimensional crystal. To disentangle contributions of disorder in the different transport phenomena at play in such devices, it is necessary to devise new local-probe methods, and to establish links between transport and the microscopic structure of the devices. Here, we present a spatially-resolved investigation of coherent transport inside a graphene quantum ring (QR), where Aharonov-Bohm conductance oscillations are observed. Thanks to scanning gate microscopy, we first identify spatial signatures of Coulomb blockade, associated with disorder-induced localized states. We then image resonant states which decorate the QR local density of states (LDOS). Simulations of the LDOS in a model disorder graphene QR confirm the presence of such scarred states.

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