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Disorder information from conductance: a quantum inverse problem SHARDUL MUKIM, MAURO FERREIRA, Trinity College Dublin — It is straightforward to calculate the conductance of a quantum device once all its scattering centers are fully specified. However, to do this in reverse, i.e., to find information about the composition of scatterers in a device from its conductance, is an elusive task. This is particularly more challenging in the presence of disorder. We propose a procedure in which valuable compositional information can be extracted from the seemingly noisy spectral conductance of a two-terminal disordered quantum device. In particular, we put forward an inversion methodology that can identify the nature and respective concentration of randomly-distributed impurities by analyzing energy-dependent conductance fingerprints. Results are shown for graphene nanoribbons as a case in point using both tight-binding and density functional theory simulations, indicating that this inversion technique is general, robust and can be employed to extract structural and compositional information of disordered mesoscopic devices from standard conductance measurements [1].

[1]s. mukim et al, **PhysRevB.102.075409**

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