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Electronic Veselago lensing in graphene PN junctions.

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Ballistic electrons in a uniform 2D electron gas (2DEG) behave in close analogy to light propagating through an optical medium. In the absence of impurity scattering, electrons follow straight-line trajectories, while the associated de Broglie wavelength can give rise to interference and diffraction. Here we present measurements of ballistic graphene devices in which a graphite gate is used to realize an atomically-smooth junction. We demonstrate unambiguous signatures of negative refraction across a PN junction, paving the way for electron optics inspired by Veselago lensing. Comparison with theoretical simulations reveals the importance of the junction profile towards this effort. Opportunities for future device designs that may take advantage of these effects will be discussed.