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**Gate-tunable electron focusing across graphene p-n junction** SHAOWEN CHEN, Columbia University, ZHENG HAN, Institute of Metal Research, Chinese Academy of Sciences, LEI WANG, Cornell University, CORY DEAN, JAMES HONE, Columbia University — Electrons moving across a ballistic semiconductor junction experience a change in trajectory described by an electronic version of Snell's law. In the case of a barrier separating regions of $n$ and $p$type carriers, negative refraction is expected, which theoretically leads to a Veselago type of electron focusing. Being a ballistic bipolar 2D system, hexagonal Boron Nitride-encapsulated graphene is expected to be a model a system to realize this effect, however, robust demonstration of veselago lensing has remained limited. We describe novel methods to fabricate high quality graphene p-n junctions with atomically sharp boundaries. Using a magnetic focusing measurement scheme, we demonstrate unambiguous signatures of negative refraction in these devices. Our observations are in good agreement with simulations and shed light on future application for electronic optics in ballistic graphene.

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