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Spatially resolving density-dependent screening around a single charged atom in graphene DILLON WONG, Univ of California - Berkeley, FABIANO CORSETTI, Imperial College London, YANG WANG, VICTOR BRAR, HSIN-ZON TSAI, QIONG WU, Univ of California - Berkeley, ROLAND KAWAKAMI, Ohio State University, ALEX ZETTL, Univ of California - Berkeley, ARASH MOSTOFI, JOHANNES LISCHNER, Imperial College London, MICHAEL CROMMIE, Univ of California - Berkeley — Due to the relativistic nature of its charge carriers, graphene has very unique screening properties. We have explored the screening of an individual Ca ion as a function of Dirac quasiparticle density in graphene by combining scanning tunneling microscopy (STM) with a gate-tunable graphene device. We find that the screening length in graphene is very gate-tunable, decreasing with increasing charge carrier density. Comparing our experimental results to tight-binding calculations provides new insight into electron-electron interactions in graphene, as well as the fundamental behavior of relativistic fermions in the presence of charged impurities.

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