

Abstract Submitted  
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**Experimental Evidence of Giant Non-reciprocity of WGM Modes in Graphene** YUE ZHAO, Dept. of Physics, South University of Science and Technology of China; Center for Nanoscale Science and Technology, NIST; Maryland Nanocenter, UMD, JONATHAN WYRICK, FABIAN NATTERER, Center for Nanoscale Science and Technology, NIST, JOAQUIN RODRIGUEZ-NIEVA, Dept. of Physics, Massachusetts Institute of Technology, KENJI WATANABE, TAKASHI TANIGUCHI, National Institute for Material Science, Japan, LEONID LEVITOV, Dept. of Physics, Massachusetts Institute of Technology, NIKOLAI ZHITENEV, JOSEPH STROSCIO, Center for Nanoscale Science and Technology, NIST — Klein scattering in a circular graphene pn junction can lead to Whispering Gallery Mode(WGM) type resonances[1]. Utilizing the electrostatic potential induced by the probe of a scanning tunneling microscope, we create graphene electron resonators defined by circular pn junctions. These quasi-confined WGM states can be probed by tunneling spectroscopy measurements. With small applied magnetic fields, we observe a large energy splitting of the WGM states, displaying a manifestation of non-reciprocity due to Klein scattering of massless Dirac fermions in graphene [2].

1. Y. Zhao, et. al., *Science* 348(6235), 672-675
2. J. F. Rodriguez-Nieva, L. S. Levitov, *arXiv: 150806609*

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