

Observation of exceptional points in active non-Hermitian graphene metasurfaces

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Abstract

In this talk, we demonstrate that exceptional points and phase singularities can be observed in a non-Hermitian metasurface. By designing a metasurface composed of hybrid meta-atoms with anisotropic radiation loss and using graphene to control the intrinsic coupling between the meta-atom components, the polarization eigenstates of the metasurface can be manipulated through variation of radiation frequency and graphene's optical conductivity. We have observed a polarization phase singularity for the first time at an exceptional point in the transmission through an anisotropic metasurface. By analyzing the transmission data of the metasurface, we observe phenomena unique to exceptional points including level repulsion behavior, geometric phase under encirclement of the exceptional point, and asymmetric transmission of circularly polarized radiation.

Keywords: *Graphene, Metasurfaces, Non-Hermitian photonics, Exceptional point*

Biography

Dr. Teun-Teun Kim is currently a Young Scientist Fellow at Center for Integrated Nanostructure Physics, Institute for Basic Science (IBS), Sungkyunkwan University. He received his Ph.D. degrees in Department of Physics from Korea Advanced Institute of Science and Technology (KAIST) in 2010. He did his post-doctoral work at KAIST (2010-2013) and continues as a Marie Curie Research Fellow (2013-2017) at University of Birmingham.