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**Electrically controlled magnetic circular dichroism and Faraday rotation in graphene.** ALEXEY KUZMENKO, JEAN-MARIE POUMIROL, University of Geneva, PETER Q. LIU LIU, ETH Zurich, TETIANA SLIPCHENKO, CSIC-Universidad de Zaragoza, ALEXEY NIKITIN, CIC nanoGUNE, LUIS MARTIN-MORENO, CSIC-Universidad de Zaragoza, JEROME FAIST, ETH Zurich — Magnetic circular dichroism (MCD) and Faraday rotation (FR) are the fundamental phenomena of great practical importance arising from the breaking of the time reversal symmetry by a magnetic field. In most materials the strength and the sign of these effects can be only controlled by the field value and its orientation. Using broadband terahertz magneto-electro-optical spectroscopy, we demonstrate that in graphene both the MCD and the FR can be modulated in intensity, tuned in frequency and, importantly, inverted using only electrostatic doping at a fixed magnetic field due to the unique properties of the Dirac fermions. Our results indicate the fundamental possibility of compact, efficient, electrically invertible and wavelength-tunable non-reciprocal passive terahertz elements based on graphene operating at ambient temperature.

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