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Chiral electromagnetic waves in Weyl semimetals ALEXANDER ZYUZIN, University of Basel, VLADIMIR ZYUZIN, University of Florida — We show that Weyl semimetals with broken time-reversal symmetry is an optically gyrotropic media and can host chiral electromagnetic waves. The magnetization in the system that results in a momentum space separation of a pair of opposite chirality Weyl nodes is also responsible for the non-zero gyration vector in the system. We show that in the region where the magnetization flips its directions (magnetic domain wall) there exist a chiral electromagnetic field localized at the domain wall and propagating along it. The direction of propagation is determined by the sign of the gyrotropy factor. Such magnetic domain walls might appear naturally in the Weyl semimetal materials, or, for example, they can be created with a help of a ferromagnetic material placed in proximity. The chiral electromagnetic wave propagating at the domain walls is an analog of quantum Hall state for photons.

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