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Topological Z_2 Gapless Photonic Crystals BIYE XIE, ZIDAN WANG, The University of Hong Kong — Topological properties of electronic materials with gapless band structure such as Topological Semimetals(TSMs) and Topological Metals(TMs) have drew lots of attention to both theoretical and experimental physicists recently. Although theoretical prediction of TSMs and TMs have been done well, experimental study of them is quite difficult to perform due to the fact that it is very difficult to control and design certain electronic materials. However, since the topological properties stem from the geometric feature, we can study them in Photonic Crystals(PhCs) which are much easy to be controlled and designed. Here we study 2-dimension PhCs consisting of gyrotropic materials with hexagonal structure. In the Brillouin corner, the dispersion relation has gapless points which are similar to Dirac Cones in electronic materials. We firstly derive the effective Hamiltonian of this system and show that if certain perturbation is added to this effective Hamiltonian, this system belongs to AII class according to Altland and Zirbauer topological classification and is described by a Z_2 topological charge. Finally we also propose a way to detect this Z_2 topological charge using momentum space Aharonov-Bohm interferometer which is firstly proposed by L.Duca and T.Li,etc.

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