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Linear and Non linear Terahertz Behavior of Topological Insulators Materials.

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The great potential of electrons (Dirac and Weyl) with linear energy/momentum dispersion for integrated photonics has been readily recognized after their discovery in graphene. Dirac carriers are also found in Topological Insulators (TI), quantum systems having an insulating gap in the bulk and intrinsic Dirac metallic states at the surface, while Weyl electrons appear in topological semimetals. In this talk, after a brief panoramic of Topological Quantum Materials properties, I will discuss their applications in linear and non-linear optics and plasmonics. In particular, I will review several experiments proving the exotic optical phenomena appearing in topological matter and its potential applications in quantum devices.