

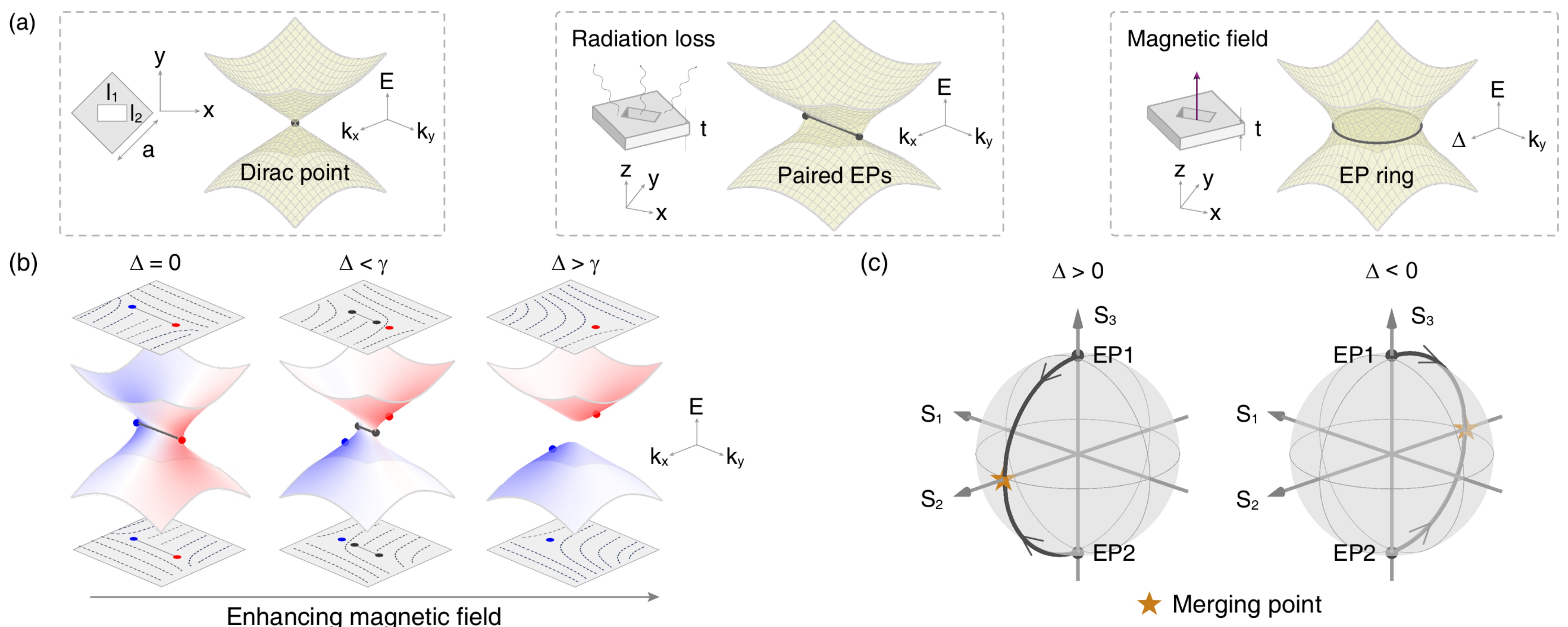
# Magnetically Induced Topological Evolutions of Exceptional Points in Photonic Bands

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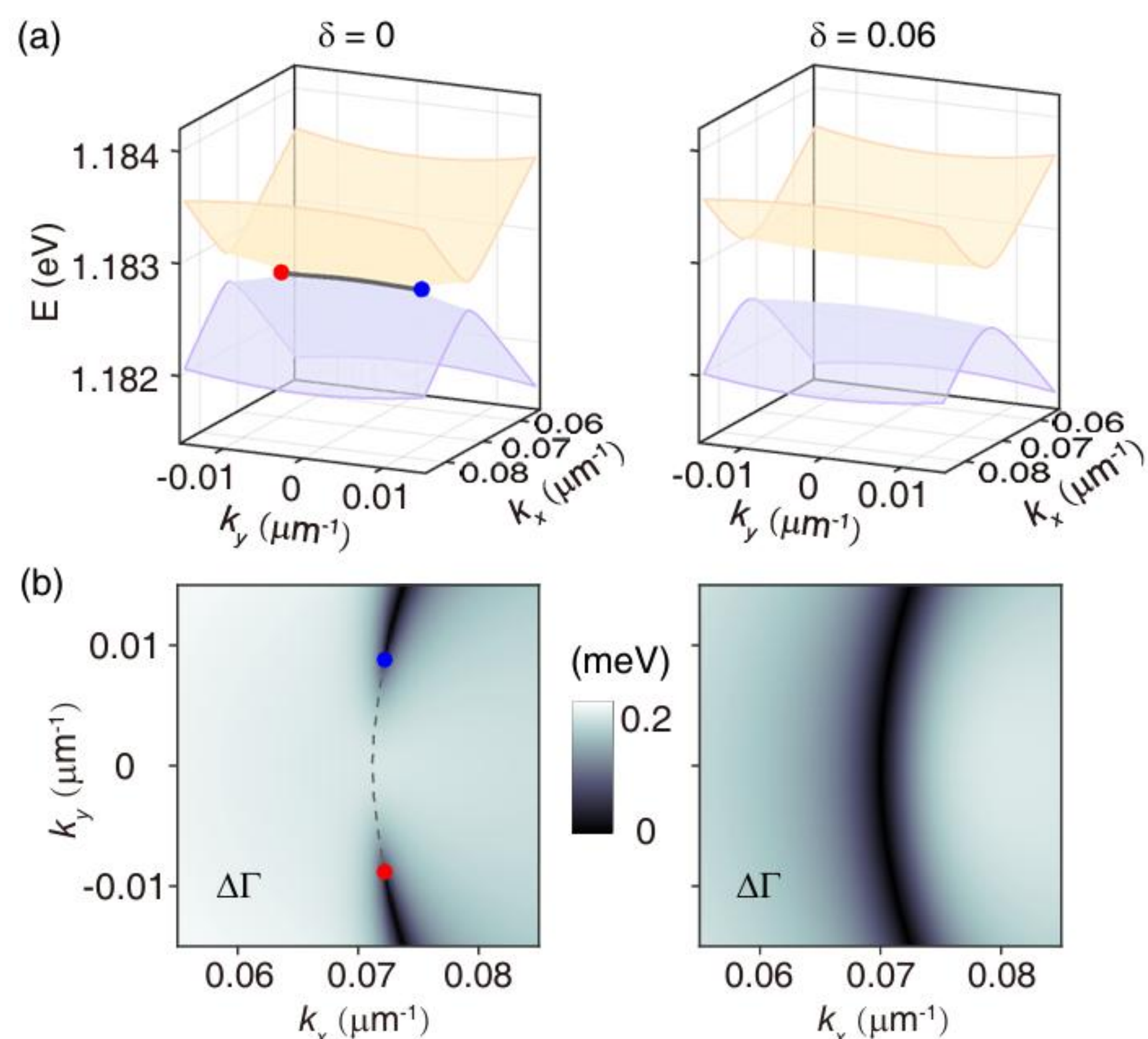
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## Physical pictures of the EPs' evolution under external magnetic field



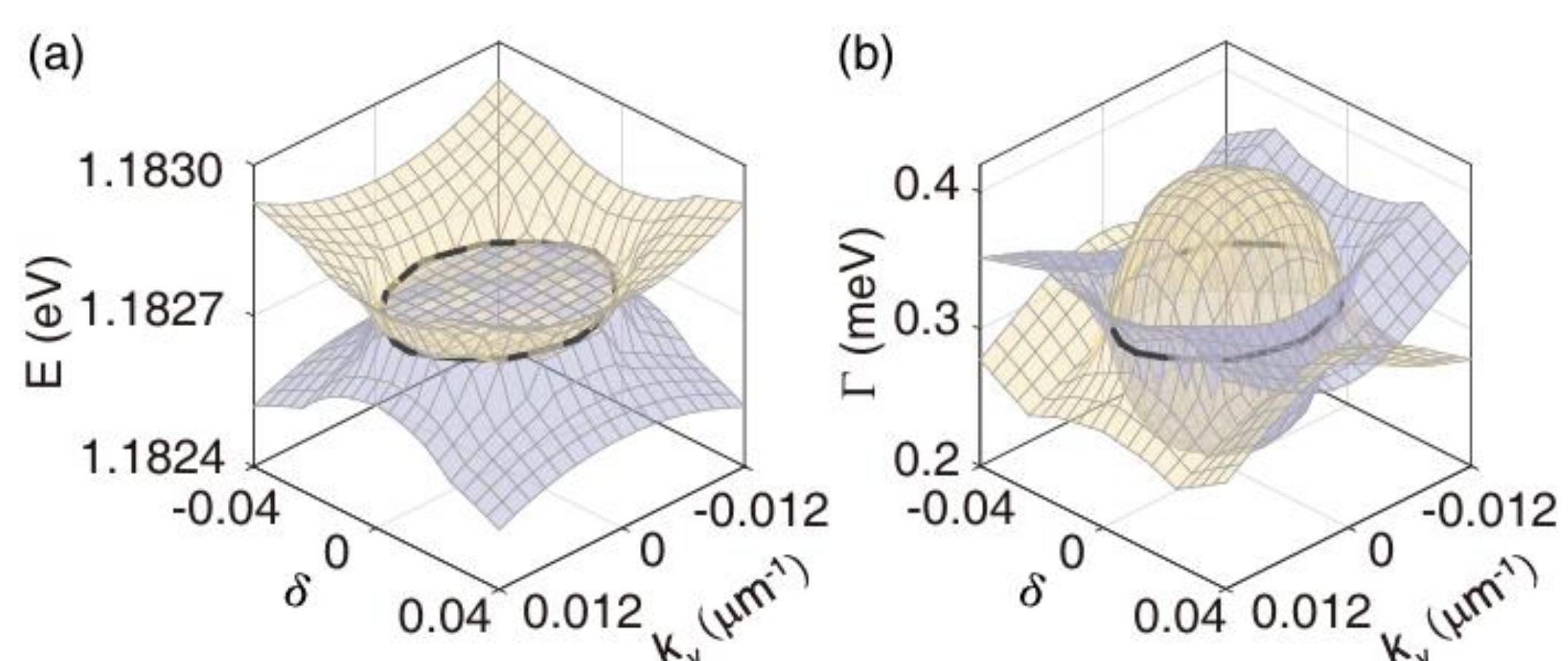
In photonic crystal slabs, due to the radiative loss, a Dirac point present in the Hermitian case evolves into a pair of exceptional points (EPs). As an external magnetic field is applied and increased, the EPs move closer together and eventually merge and annihilate, accompanied by characteristic changes in the polarization states. When the magnetic field is treated as an extra parameter, the EPs trace out a closed ring.

## Evolutions of band structures



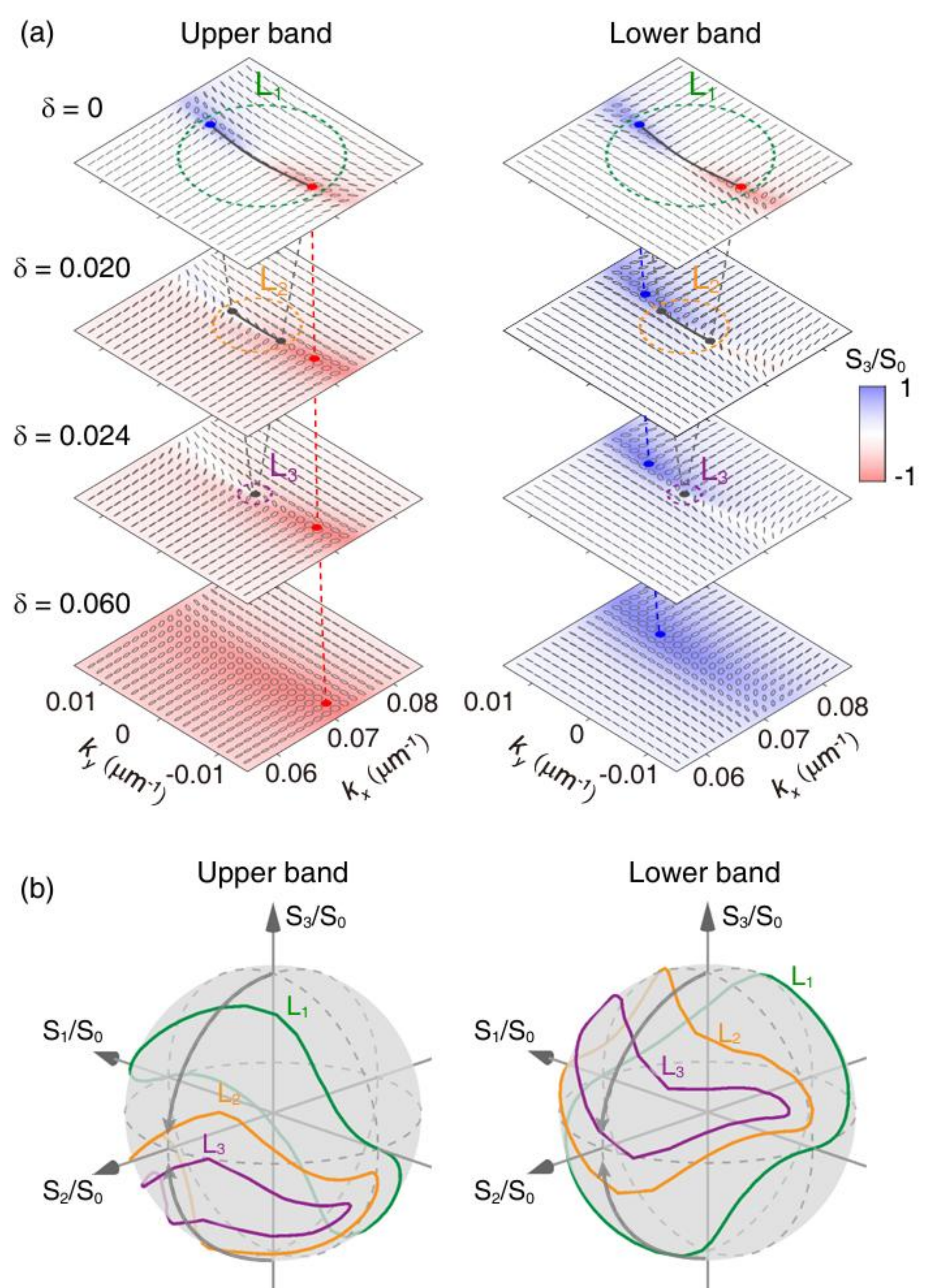
Without the external magnetic field, a bulk Fermi arc links the EPs. In contrast, with a strong magnetic field, real parts of the two bands are separate, and EPs do not exist.

## EP ring configuration



Calculated results for the EP ring in the  $k_y$ - $\delta$  space. The EP ring is denoted by the black curve.

## Evolutions of polarization distribution



As the magnetic field increases, the polarization of EPs transitions from circular to linear, and EPs eventually merge and disappear. Meanwhile, C points emerge and the topological charge originally associated with the Fermi arc is transferred to these C points.