Topological Edge States in Systems of Spoof Surface Plasmon Polaritons

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Abstract: Topological properties of electromagnetic waves propagating in the periodic systems have received considerable research interest recently. In photonic crystals, a class of surface states can be interpreted from the bulk-interface correspondence if a topological phase transition takes places. And these surface states may render the robust one-way transport possible in photonic systems. In this talk, we will introduce some recent works in topological interface states in 1D and 2D systems of spoof SPPs, including: 1) SSH model in the 1D system, experimental investigation of bulk-interface correspondence based on the Zak phase, and the accidental degeneracy and interface states in the hybridized plasmonic and photonic systems; 2) "valley-polarized" interface states in the 2D spoof surface plasmon systems, and the related robust one-way transport, beam splitter and Z-shape waveguides.

References:

1. L. Lu, J. D. Joannopoulos and M. Soljačić, *Topological photonics*, Nat. Photonics 8, 812 (2014).
2. X. Wu, Y. Meng, J. Tian, Y. Huang, H. Xiang, D. Z. Han, W. J. Wen, *Direct observation of valley-polarized topological edge states in designer surface plasmon crystals*, Nat. Commun. 8, 1304 (2017).
3. L. Ge, L. Liu, M. Xiao, G. Du, L. Shi, D. Z. Han, C. T. Chan, J. Zi, *Topological phase transition and interface states in hybrid plasmonic-photonic systems*, J. Opt. 19(6), 06LT02 (2017).
4. Y. Meng, H. Xiang, R. Zhang, X. Wu, D. Z. Han, C. T. Chan, W. J. Wen, *Topological interface states in multiscale spoof-insulator-spoof waveguides*, Opt. Lett. 41(16), 3698-3701 (2016).