

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Entangled Terahertz photon pair emitting diode with a HgTe quantum dot LI-KUN SHI, Beijing CSRC, KAI CHANG, SKLSM, Institute of Semiconductors, Chinese Academy of Sciences, P. R. China, CHANG-PU SUN, Beijing Computational Science Research Center, Beijing 100094, China — We propose an experimentally feasible scheme for generating entangled terahertz photons in topological insulator quantum dots (TIQDs). We demonstrate theoretically that in TIQDs with disorders and irregular shapes: 1) the fine structure splitting, which is the obstacle to produce entangled photons in conventional semiconductor quantum dots, is inherently absent for one-dimensional massless excitons due to the time-reversal symmetry; 2) the selection rules obey winding number conservation instead of the conventional angular momentum conservation between edge states with a linear dispersion. With these two advantages, the entanglement of the emitted photons during the cascade in our scheme is robust against unavoidable disorders and morphology fluctuations of the TIQD.

Li-Kun Shi
Beijing CSRC

Date submitted: 06 Jan 2016

Electronic form version 1.4