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Topological Phase Transition with Cold Atoms Trapped in an Optical Lattice XIONG-JUN LIU, XIN LIU, Department of Physics, Texas A&M University, College Station, Texas 77843-4242, USA, CONGJUN WU, Department of Physics, University of California, San Diego, California 92093, USA, JAIRO SINOVA, Department of Physics, Texas A&M University, College Station, Texas 77843-4242, USA — Recently, great attention has been attracted by the study of topological phase transition between usual insulating phase and topological insulating phase, which has not only the potential applications but also fundamental importance from a basic physics point of view. In this work we propose the realization of topological insulators in an optical lattice which can be generated from available experimental set-ups with minor modifications. In the time-reversal symmetry breaking and time-reversal symmetric case, we show the topological phase transition from usual insulating phase to the quantum anomalous Hall phase and quantum spin Hall phase, respectively. The experimental detection of the topological states is also studied in detail.

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