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**Two-Dimensional Topological Insulator State and Topological Phase Transition in Bilayer Graphene** ZHENHUA QIAO, WANG-KONG TSE, Department of Physics, The University of Texas at Austin, Austin, Texas 78712 USA, HUA JIANG, International Center for Quantum Materials, Peking University, Beijing 100871, China, YUGUI YAO, School of Physics, Beijing Institute of Technology, Beijing 100081, China, QIAN NIU, Department of Physics, The University of Texas at Austin, Austin, Texas 78712 USA — In this talk, we show that gated AB-stacking bilayer graphene can host a quantum phase transition from a quantum valley Hall (QVH) insulator to a two-dimensional strong topological insulator (TI) as a function of Rashba spin-orbit (SO) coupling. Different from a conventional TI phase, the edge modes of our strong TI phase exhibit both spin and valley filtering, and thus share the properties of both TI and QVH insulators. The strong TI phase remains robust in the presence of weak intrinsic SO coupling.

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