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Topological phase transition on honeycomb lattice with third neighbor hooping[1] YAO-HUA CHEN, Texas Center for Superconductivity and Department of Physics, University of Houston, HSIANG-HSUAN HUNG, Department of Physics, University of Texas at Austin, C.S. TING, Texas Center for Superconductivity and Department of Physics, University of Houston — The topological phases originating in spin-orbital coupling systems have attracted great attention in modern condensed matter physics. Many interesting phenomena have been found in recent theoretical and experimental works, such as the integer and fractional quantum Hall effect, topological band insulator, topological Mott insulator, and topological superconductor. We have investigated the topological phase transition on honeycomb lattice with third neighbor hooping by employing the cellular dynamical mean-field theory combining with the continuous-time Monte Carlo method. The non-trivial topological insulator can be found by observing the spin Chern number directly, and the effects of the third neighbor hopping and interaction are also discussed. Furthermore, we also provide the whole phase diagram for interaction, third neighbor hopping, and temperature.

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