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Topological phase transition in an *sp*- orbital chain XIAOPENG LI, Department of Physics and Astronomy, University of Pittsburgh, ERHAI ZHAO, Department of Physics and Astronomy, George Mason University, W. VINCENT LIU, Department of Physics and Astronomy, University of Pittsburgh — We study an *sp*- orbital chain. The existence of edge states is discovered for this system. The quantum phases of the chain filled with fermions (half filling) are studied with exact diagonalization. We find a topological phase of fermions with edge states occupied. The topological phase is robust against small interactions. With sufficiently strong interaction the fermion system undergoes a topological phase transition to a inter-chain paired phase.

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