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Multiple Topological phase transitions induced by magnetic ordering in $\text{Cd}_2\text{Ru}_2\text{O}_7$ ¹ HONGMING WENG, QUANSHENG WU, ZHONG FANG, XI DAI, Beijing National Laboratory for Condensed Matter Physics, and Institute of Physics, Chinese Academy of Sciences, T03 GROUP, INSTITUTE OF PHYSICS, CHINA TEAM — The magnetic and electronic structures of pyrochlore Ruthenates $\text{Cd}_2\text{Ru}_2\text{O}_7$ are studied by means of first principle calculation. We find that the paramagnetic phase stabilized in high temperature is a three dimensional Z_2 topological insulator. While in low temperature the all-in/all-out type anti-ferromagnetic order appears, which leads to three different topologically non-trivial phase can be stabilized upon cooling, namely the axion insulator, Weyl semi-metal and intrinsic polarization phases. The detailed evolution of both bulk and surface electronic structures as the function of magnetic order parameter are obtained. Based on the above observations we propose several experimental consequences, which can be detected by further experiments.

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