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Topological phases in Iridium oxide superlattices: quantized anomalous charge or valley Hall insulators HAE-YOUNG KEE, YIGE CHEN, University of Toronto — Designing materials is one of intense topics in modern condensed matter physics. Recently, how to achieve a topological insulator in transition metal oxides with strong spin-orbit coupling became an interesting subject. We have investigated possible topological phases in orthorhombic perovskite Iridium (Ir) oxide superlattices grown along the [001] crystallographic axis. We found that bilayer Ir oxide superlattices exhibit quantized anomalous Hall effects in magnetic topological insulating phases. We also found, depending on the stacking of two layers, a valley Hall insulator with nontrivial valley dependent surface modes and a topological crystalline insulator with the crystal symmetry protected edge states can be realized. Experimental tools to detect such topological phases are also discussed.

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