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Abstract for an Invited Paper
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Designing the Next Generation of Quantum Materials

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I will discuss some of the unique functionalities offered by transition metal oxides such as high superconducting transition temperatures in the cuprates, colossal magnetoresistance in the manganites, and large thermopower in the cobaltates, all in the 3d row of the periodic table. I will then move toward oxides with high atomic number, Z , in the 4d and 5d rows where both spin-orbit coupling and Coulomb correlation become important yielding quantum matter with topological order and unusual Hall effects.