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**Chern Insulators from Heavy Atoms on Magnetic Substrates**

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Chern insulators, or quantum anomalous Hall insulators, would display a variety interesting and potentially useful properties; however, existing methods for constructing Chern insulators have proven challenging, and have thus far been limited to low temperatures. We propose a new method for searching for Chern insulators by depositing atomic layers of elements with large spin-orbit coupling (e.g., Bi) on the surface of a magnetic insulator. We argue that such systems will typically have isolated surface bands with nonzero Chern numbers. If these bands overlap in energy, a metallic surface with large anomalous Hall conductivity will result; if not, a Chern-insulator state will typically occur. We use first principles calculations to verify this search strategy by considering heavy atoms on the surfaces of MnTe, MnSe, and EuS, as well as more recent results on several promising oxide and nitride surfaces. We find many Chern insulators in both cases, including examples with large band gaps.