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Topological staggered field-electric effect with bipartite magnets¹ STEFAN REX, Norwegian Univ Tech (NTNU), FLAVIO S. NOGUEIRA, IFW Dresden and Ruhr-Universitaet Bochum, ASLE SUDBO, Norwegian Univ Tech (NTNU) — We theoretically study the interface physics of a bipartite magnetic insulator deposited on a topological insulator (TI), focusing on the topological magnetoelectric (TME) effect that occurs in the presence of a magnetization orthogonal to the TI surface. We show that the TME term can take the opposite sign for the two components of the bipartite magnet within a certain parameter region. In that case, an electric field will - unlike in the usual TME effect - mainly generate a staggered field rather than a net magnetic polarization at the interface. Our model comprises ferrimagnets and ferromagnets with multiple magnetic components per unit cell. Antiferromagnets may be considered as well if a net magnetization is achieved by magnetic doping of the TI. Our fully analytic results are obtained by field-theoretic calculations that account for quantum fluctuations on the surfaces of the TI and the magnetic material.

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Stefan Rex Norwegian Univ Tech (NTNU)

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