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Electrical generation of spin in crystals with reduced symmetry DIMITRIE CULCER, The University of Texas at Austin, Austin TX 78712-1081, YU GUI YAO, International Center for Quantum Structures, CAS, Beijing 100080, China, ALLAN MACDONALD, QIAN NIU, The University of Texas at Austin, Austin TX 78712-1081 — We propose a way of generating a spin polarization in crystals with strong spin-orbit interactions. We show that, in the presence of an electric field, there exists an intrinsic torque term which gives rise to a nonzero spin generation rate. This spin generation rate is experimentally observable, as recent experimental progress in the detection of spin accumulation has shown. The wide applicability of this effect is emphasized by explicit consideration of a range of examples: bulk wurtzite and strained zincblende (n-GaAs) lattices, as well as quantum well heterojunction systems.

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