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Current-induced spin and orbital magnetizations in tellurium TAIKI YODA, MOTOAKI HIRAYAMA, TAKEHITO YOKOYAMA, Department of Physics, Tokyo Institute of Technology, SHOJI ISHIBASHI, TAKASHI MIYAKE, Nanosystem Reserch Institute, AIST, SHUICHI MURAKAMI, Department of Physics, Tokyo Institute of Technology; TIES, Tokyo Institute of Technology — Tellurium has a characteristic helical lattice structure, and lacks inversion and mirror symmetries. Such chiral crystals lead to various novel phenomena. For example, we have shown that spin and orbital magnetizations are induced by an electric current in chiral crystals[1]. In our presentation, we calculate the current-induced spin and orbital magnetization in tellurium by using first-principles calculations. The calculations show that both spin and orbital magnetizations are induced parallel to the electric current. In tellurium we found that the orbital magnetization is larger than the spin magnetization by two orders of magnitude. The spin magnetization is induced by the current via the spin-orbit coupling. Therefore, the induced spin magnetization is limited by the size of the spin-orbit coupling. On the other hand, the orbital magnetization is determined by crystal structure without spin-orbit coupling. By using a chiral crystal, a magnetization can be induced by an electric current without ferromagnets and the spin-orbit coupling. [1]Yoda, T. et al. Sci. Rep. 5, 12024

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