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Nonreciprocal charge transport in noncentrosymmetric superconductors RYOHEI WAKATSUKI, YU SAITO, Univ of Tokyo, SHINTARO HOSHINO, RIKEN, TOSHIYA IDEUE, MOTOHIKO EZAWA, Univ of Tokyo, YOSHIHIRO IWASA, NAOTO NAGAOSA, Univ of Tokyo, RIKEN — In systems without the inversion symmetry, the I-V characteristics can show the asymmetric behavior between positive and negative directions. It is called nonreciprocal charge transport, and the most famous example is the p-n junction, where the inversion symmetry is broken by its structure. Even in bulk crystals, the nonreciprocal transport occurs, however, the amplitude is usually very small. In this talk, we focus on the resistive regime of noncentrosymmetric superconductors, where the superconducting fluctuation conductivity is dominant. As an example, we study the monolayer transition metal dichalcogenides MoS2 theoretically, and show that the nonreciprocal charge transport is dramatically enhanced compared to the normal regime, which is consistent with the experiment. This dramatic enhancement of the nonreciprocal transport comes from the difference between the Fermi energy and the superconducting gap. Therefore, we expect that this enhancement occurs in any other noncentrosymmetric superconductors.

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