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Superconductivity and chiral superconducting transport in WS2 nanotube FENG QIN, The University of Tokyo, WU SHI, The University of Tokyo and Lawrence Berkeley National Laboratory, TOSHIYA IDEUE, MASARO YOSHIDA, The University of Tokyo, ALLA ZAK, Holon Institute of Technology, RESHEF TENNE, Weizmann Institute of Science, TOMOKA KIKITSU, DAISHI INOUE, DAISUKE HASHIZUME, RIKEN Center for Emergent Matter Science, YOSHIHIRO IWASA, The University of Tokyo and RIKEN Center for Emergent Matter Science, THE UNIVERSITY OF TOKYO TEAM, LAWRENCE BERKELEY NATIONAL LABORATORY COLLABORATION, HOLON INSTITUTE OF TECHNOLOGY COLLABORATION, WEIZMANN INSTITUTE OF SCIENCE COLLABORATION, RIKEN CENTER FOR EMERGENT MATTER SCIENCE COLLABORATION — We will report the first observation of superconductivity in individual nanotube of tungsten disulfide realized by electrochemical doping. We will also report the exotic nonreciprocity in superconducting transport originating from tube chirality, in which the forward and backward supercurrent flows are inequivalent due to inversion symmetry breaking. The nonreciprocal signal is significantly enhanced at low temperature reflecting the coherence of superconducting state, and simultaneously displays the periodic quantum oscillations associated with the Little-Parks effect. The present results indicate that the nonreciprocity should be a new approach toward the superconductors with chiral or noncentrosymmetric structures.

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