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Valley-selective harmonic generations in transition metal dichalcogenide monolayers JINGXIN CHENG, TAO JIANG, YUWEI SHAN, YINGGUO LI, Fudan University, XIANHUI CHEN, University of Science and Technology of China, Y.R. SHEN, Fudan University; University of California, Berkeley, WEITAO LIU, SHIWEI WU, Fudan University — Transition metal dichalcogenide monolayer has emerged as another star in the family of atomically thin two dimensional materials. Different from graphene, the two sublattices in its honeycomb-like structure are occupied by different atoms, leading to the reduced rotational symmetry from six fold to three fold. The reduced symmetry and dimension not only result in many intriguing physics such as valley and excitons, but also lead to rich nonlinear optical phenomena such as strong second harmonic generation. In this talk, we will present a systematic study on linearly and circularly polarized harmonic generations in this wonder material. We show that both the second and third harmonic generations follow the conservation of angular momentum and are valley-selective. Furthermore, these nonlinear optical processes could be used as a powerful imaging tool for studying transition metal dichalcogenide monolayers and other similar 2D materials.

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