Abstract Submitted
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Photon-gated spin transistor via optical control of magnetism in manganite[1] LI FAN, SONG CHENG, PAN FENG, Tsinghua Univ — The optical control of magnetism of La1/2Sr1/2MnO3-δ (LSMO) was observed according to the variation of magnetoresistance under the illumination of a common used light emitting diode.[1] An increase of saturation field under light illumination is observed, which is ascribed to the photon-induced spin transition from up spins to down spins, considering the half-metallic electronic structure given by first-principles calculations. Then we designed and prepared a new type of photon-gated spin transistor via partial illumination of the device channel, while an effective transient gate operation of the device conductance via optical method is demonstrated.[2] This optical gating effect has an obvious enhancement with the increase of the light intensity and shows a good repeatable cycling properties. Besides the fundamental significance, our finding would offer a twist for gate operation of spin FET and advance the application of optical manipulation of magnetism in spintronics for ultrafast data processing. [1] Li et al, Optical control of magnetism in manganite film, Phys. Rev. B 2016, 93, 024406. [2] Li et al, Photon-gated spin transistor, Adv. Mater. doi: 10.1002/adma.201604052.

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Li Fan
Tsinghua Univ

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