Abstract Submitted
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Theoretical analysis of optical excitation and luminescence in MoS_2 monolayers[1] HANAN DERY, Department of Electrical and Computer Engineering, Department of Physics and Astronomy, University of Rochester, Rochester, New York, 14627, YANG SONG, Department of Physics and Astronomy, University of Rochester, Rochester, New York, 14627 — We analyze the absorption and circularly polarized luminescence spectra of MoS_2 monolayers. We show that indirect optical transitions can fully explain the observed decrease in circular polarization degree when increasing the lattice temperature or the exciting photon energy. This spin-conserving optical process is assisted by electron-phonon or electron-impurity interactions giving rise to intervalley transitions to intermediate virtual states. Spin-flip mechanisms, on the other hand, are shown to be insufficient in explaining the experimental results due to their relatively long timescales compared with the radiative timescales in monolayer dichalcogenides (tens of ps).

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