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Spin relaxation in hole-doped transition metal dichalcogenides with the crystal defects TETSURO HABE, MIKITO KOSHINO, Tohoku University — We theoretically investigate the electronic spin relaxation effect in the hole-doped monolayer and bilayer transition-metal dichalcogenides in the presence of the crystal defects. We simulate lattice vacancies in the multi-orbital tight-binding model obtained by the first-principle method and actually estimate the spin relaxation rate by using the tight-binding model. In the monolayer, the spin-relaxation time is found to be much longer than the momentum relaxation time, and this is attributed to the fact that the spin hybridization in the band structure is suppressed by the mirror reflection symmetry. The bilayer TMD has a much shorter spin relaxation time in contrast because of the stronger spin hybridization due to the absence of the mirror symmetry.

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