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**Signatures of the crystal symmetry after Dyakonov-Perel spin relaxation of photoexcited hot electrons in semiconductor heterostructures**[1]

LAN QING, HANAN DERY, Department of Physics and Astronomy, University of Rochester, Rochester, New York 14627 — We reveal unique manifestations of the intimate relation between the crystal structure of zincblende semiconductors and their spin-orbit coupling. We show that reflection of photoexcited hot electrons is capable of tipping the direction of the optically injected net spin vector away from the propagation axis of the exciting circularly polarized beam. The effect is robust even in case of complete electron reflection from a non magnetic target (e.g., GaAs/AlAs). The tipping angle of the net spin vector after spin relaxation is determined by the effective Dyakonov-Perel magnetic field as well as by the momentum alignment and spin-momentum correlation of the initial photoexcited electron population. All of these crystal-structure dependent mechanisms contribute due to the reflection plane induced symmetry breaking. We perform Monte Carlo simulations to calculate the tipping angle and also provide qualitative derivations of the effect. Results are shown for non-magnetic semiconductor heterostructures and for hybrid semiconductor/ferromagnet systems.

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