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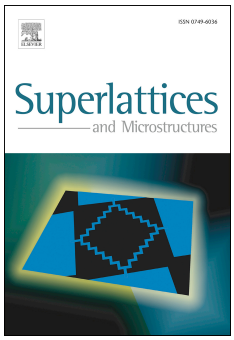

Velocity barrier-controlled of spin-valley polarized transport in monolayer WSe_2 junction

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Velocity barrier-controlled of spin-valley polarized transport in monolayer WSe_2 junction

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Abstract: In this work, we have theoretically investigated the influence of velocity barrier on the spin-valley polarized transport in monolayer (ML) WSe_2 junction with a large spin-orbit coupling (SOC). Both the spin-valley resolved transmission probabilities and conductance are strong dependent on the velocity barrier, as the velocity barrier decreases to 0.06, a spin-valley polarization of exceeding 90% is observed, which is distinct from the ML MoS_2 owing to incommensurable SOC. In addition, the spin-valley polarization is further increased above 95% in a ML WSe_2 superlattice, in particular, it's found many extraordinary velocity barrier-dependent transport gaps for multiple barrier due to evanescent tunneling. Our results may open an avenue for the velocity barrier-controlled high-efficiency spin and valley polarizations in ML WSe_2-based electronic devices.

Keywords: Spin; Valley; Polarization; WSe_2; Velocity barrier

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