

Abstract Submitted
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Quantum control of spin-orbit mixed quantum states in a four-level molecule system coupled by three lasers JIANBING QI, Penn State University — We study the ac Stark effect in a spin-orbit mixed four-level molecular system coupled by three lasers. The spin-orbit mixed rovibrational levels in diatomic molecules are very common. The mixed states can carry both characteristics of the singlet and triplet states depending on the degree of mixing. The spin-orbit mixed states have been used as gateways to access some normally prohibited transitions in laser spectroscopy. The mixing coefficient of the mixed states varies from case to case. However, by coupling the mixed states to auxiliary quantum states with lasers, the mixing coefficient of the singlet-triplet states can be modified by ac Stark effect via the Rabi frequency of the lasers and the detuning of the laser frequency. We use density matrix equations in a four-level molecular model to show that a mixed singlet-triplet pair of rovibrational levels can be controlled to enhance the access to the target quantum states.

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