Abstract Submitted
for the DAMOP20 Meeting of
The American Physical Society

Control in a spin-orbit mixed four-level molecular system coupled by three lasers JIANBING QI, Penn State University, Berks Campus — In laser spectroscopy, spin-orbit mixed singlet-triplet rovibrational molecular levels are commonly used as a gateway to access some normally spin forbidden transitions to higher excited triplet electronic molecular states since the mixed states can carry both triplet and singlet characteristics. By coupling the mixed states to an auxiliary quantum state with lasers, the spin-orbit mixing coefficient of two mixed levels can be modified by ac Stark effect via varying the Rabi frequency of the coupling lasers and the detuning of the laser frequency. We use density matrix equations and a four-level molecular model to show that coupled spin-orbit mixed singlet-triplet rovibrational levels can be used as a channel to enhance the probability of accessing target quantum states.

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Date submitted: 02 Feb 2020 Electronic form version 1.4