

Abstract Submitted
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All-optical control of quantum state singlet-triplet character by Autler-Townes splitting.¹ OMER SALIHOGLU, PENG QI, SONJA INGRAM, ERGIN AHMED, MARJATTA LYYRA, Physics Department, Temple University — Using a four level extended Lambda excitation scheme [1] in ${}^7\text{Li}_2$, we have demonstrated that Autler –Townes splitting can be used to modify the mixing coefficients and thus the amount of singlet or triplet character of a pair of rovibrational $A^1\Sigma_u^+$ and $b^3\Pi_u$ states perturbed by the spin-orbit interaction. The singlet triplet pair of levels is naturally separated by an energy gap of 600 MHz. As indicated earlier [2] such control of molecular valence electron spin polarization can be used to create new gateway levels to the dark manifold of triplet states in molecular systems with a singlet ground state in which the spin orbit interaction is very weak and only a few gateway levels to triplet states exist naturally. In addition, a direct measurement of the spin-orbit interaction strength is possible from the observed AT splitting lineshape [2].

1. E. Ahmed et al., J. Chem. Phys. 124, 084308 –1 to 13 (2006).
2. T. Kirova and F. C. Spano, Phys. Rev. A, 71, 063816 (2005).

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Marjatta Lyyra
Temple University

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