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Toward Trapped Ultracold Molecules in the Absolute Ground State NATHAN GILFOY, STEPHAN FALKE, COLIN BRUZEWICZ, Yale University, ERIC HUDSON, UCLA, DAVID DEMILLE, Yale University — We report on experimental efforts toward the coherent transfer of optically trapped RbCs molecules to their absolute, singlet ground state. Beginning with spin-polarized Rb and Cs atoms, heteronuclear molecules are formed by photoassociation and decay into high vibrational levels of the triplet ground state. The molecules can be transferred to the absolute ground state, which possesses a large electric dipole moment, via an electronically excited level of mixed singlet and triplet character. A two-photon-transfer process was previously demonstrated in our lab with pulsed lasers. We have implemented a high power cw diode laser system in order to resolve and control the rotational and hyperfine structure. Further, the transfer can be made coherent by applying a StiRAP scheme. We report on the results of high resolution spectroscopy for level selection of the coherent transfer of optically trapped molecules.

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