

Abstract Submitted
for the DAMOP12 Meeting of
The American Physical Society

Observation of Blue-Detuned Photoassociation to the $2 (0_g^+)$ State of $^{85}\text{Rb}_2$ via REMPI¹ MICHAEL BELLOS, RYAN CAROLLO, DAVID RAHMLow, JAYITA BANERJEE, MATTHEW BERMUDEZ, EDWARD EYLER, PHILLIP GOULD, WILLIAM STWALLEY, University of Connecticut — We report detection of photoassociation to vibrational levels blue of the $^{85}\text{Rb}_2$ $5s + 5p_{1/2}$ asymptote, in the previously-unobserved $2 (0_g^+)$ Hund's case (c) state that corresponds to $2 \ ^1\Sigma_g^+$ in Hund's case (a). These excited-state ultracold molecules decay to the $a \ ^3\Sigma_u^+$ state and are detected by pulsed REMPI through the $2 \ ^3\Sigma_g^+$ state. We also observe, via trap loss, the $2 (0_u^+)$, $2 (0_g^-)$, and $2 (1_g)$ states observed in [1], and confirm that these states are not the source of the observed molecules. Photoassociation through the observed levels of the $2 (0_g^+)$ state populates vibrational levels approximately halfway up the $a \ ^3\Sigma_u^+$ potential well. This pathway complements the blue-detuned photoassociation technique described in [2], which accesses the bottom of the a state potential.

[1] R. A. Cline, J. D. Miller, and D. J. Heinzen, Phys. Rev. Lett. **73**, 632 (1994)

[2] M. A. Bellos, *et. al.*, Phys. Chem. Chem. Phys. **13**, 18880 (2011)

¹This work is supported by the NSF and AFOSR.

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Date submitted: 30 Jan 2012

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