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Resonant Coupling Between Near-Degenerate Levels of the $2\,^1\Sigma_g^+$ and $1\,^1\Pi_g$ States of Ultracold $^{85}Rb_2$[1] RYAN CAROLLO, MICHAEL BELLOS, DAVID RAHMLOW, JAYITA BANERJEE, EDWARD EYLER, PHILLIP GOULD, WILLIAM STWALLEY, University of Connecticut — We report on the anomalously high line strength of a single rotational level in the ultracold photoassociation of two ^{85}Rb atoms to form $^{85}Rb_2$. The $v' = 111$, $J' = 5$ level belongs to the Hund's case (c) $2\,(0_g^+)$ state, which correlates to the Hund's case (a) $2\,^1\Sigma_g^+$ state. Its strength is caused by coupling with a very near-resonant long-range state. The long-range component is the energetically degenerate $v' = 155$, $J' = 5$ level of the case (c) $2\,(1_g)$ state, correlating to the case (a) $1\,^1\Pi_g$ state. The line strength is enhanced by an order of magnitude through this coupling, relative to nearby vibrational levels and even to nearby rotational levels of the same vibrational level.

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