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The bound states of ultracold KRb molecules PAUL JULIENNE, Joint Quantum Institute, NIST and the University of Maryland, THOMAS HANNA, NIST — Recently ultracold vibrational ground state ^{40}K^{87}Rb polar molecules have been made using magnetoassociation of two cold atoms to a weakly bound Feshbach molecule, followed by a two-color optical STIRAP process to transfer molecules to the molecular ground state [1]. We have used accurate potential energy curves for the singlet and triplet states of the KRb molecule [2] with coupled channels calculations to calculate all of the bound states of the ^{40}K^{87}Rb molecule as a function of magnetic field from the cold atom collision threshold to the $v=0$ ground state. We have also developed approximate models for understanding the changing properties of the molecular bound states as binding energy increases. Some overall conclusions from these calculations will be presented. [1] K.-K. Ni, S. Ospelkaus, M. H. G. de Miranda, A. Peer, B. Neyenhuis, J. J. Zirbel, S. Kotochigova, P. S. Julienne, D. S. Jin, and J. Ye, Science, 2008, 322, 231–235. [2] A. Pashov, O. Docenko, M. Tamanis, R. Ferber, H. Knöckel, and E. Tiemann, Phys. Rev. A, 2007, 76, 022511.

Paul Julienne
Joint Quantum Institute, NIST and the University of Maryland

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