

Abstract Submitted
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Production and Decay of Ultracold Feshbach Molecules in Bosonic and Fermionic Species. E. HODBY, S. THOMPSON, C. REGAL, M. GREINER, A. WILSON, D.S. JIN, E.A. CORNELL, C.E. WIEMAN — We investigate the production efficiency of weakly-bound, ultracold molecules in bosonic ^{85}Rb and also fermionic ^{40}K when the magnetic field is swept across a Feshbach resonance [1]. For adiabatic sweeps of the magnetic field, our novel model shows that the conversion efficiency of *both* species is solely determined by the phase space density of the atomic cloud, in contrast to a number of theoretical predictions. In the non-adiabatic regime our measurements of the ^{85}Rb molecule conversion efficiency follow a Landau-Zener model. The spontaneous dissociation of these ^{85}Rb molecules has also been observed [2]. The molecular lifetime shows a strong dependence on magnetic field, varying by three orders of magnitude between 155.5 G and 162.2 G. Our measurements are in good agreement with theoretical predictions in which molecular dissociation is driven by inelastic spin relaxation [3]. Molecule lifetimes of tens of milliseconds can be achieved close to resonance. [1] Cond-mat/0411487 [2] Phys. Rev. Lett. **94**, 020401 (2005) [3] Phys. Rev. Lett. **94**, 020402 (2005)

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