

Abstract Submitted
for the DAMOP05 Meeting of
The American Physical Society

Production and Decay of Ultracold Feshbach Molecules in Bosonic and Fermionic Species. S. THOMPSON, E. HODBY, C. REGAL, M. GREINER, A. WILSON, D.S. JIN, E.A. CORNELL, C.E. WIEMAN, JILA, Boulder, Colorado, 80309-0440 — 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)

Eleanor Hodby
JILA, Boulder, Colorado 80309-0440

Date submitted: 25 Jan 2005

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