Abstract Submitted
for the DAMOP07 Meeting of
The American Physical Society

Resonant Association of Feshbach Molecules THOMAS M. HANNA, THORSTEN KÖHLER, KEITH BURNETT, Clarendon Laboratory, Department of Physics, University of Oxford — In recent experiments, Feshbach molecules have been associated using resonant modulation of a magnetic field close to a zero-energy resonance [1, 2]. We analyse the dependence of this process upon the duration, amplitude and frequency of the modulation, as well as the temperature and density of the gas. A modulation of angular frequency ω_{L} resonantly couples a pair of atoms with relative kinetic energy $p^2/m = \bar{h}\omega_{\mathrm{L}} + E_{\mathrm{b}}^{\mathrm{av}}$ to the molecular state, where $E_{\mathrm{b}}^{\mathrm{av}}$ is the molecular bound state energy. The presence of a continuum of modes around this energy has a strong influence on the final conversion efficiency. Shifts in the modulation frequency giving maximum conversion are created by the amplitude of the modulation and the temperature of the gas. We discuss the importance of mean-field effects at short times, and predict that resonant association can be effective for binding energies of order $h \times 1$ MHz.

[1] S. T. Thompson, E. Hodby and C. E. Wieman, Phys. Rev. Lett. **95**, 190404 (2005).
[2] S. B. Papp and C. E. Wieman, Phys. Rev. Lett. **97**, 180404 (2006).

Thomas M. Hanna
University of Oxford, UK

Date submitted: 11 Apr 2007 Electronic form version 1.4