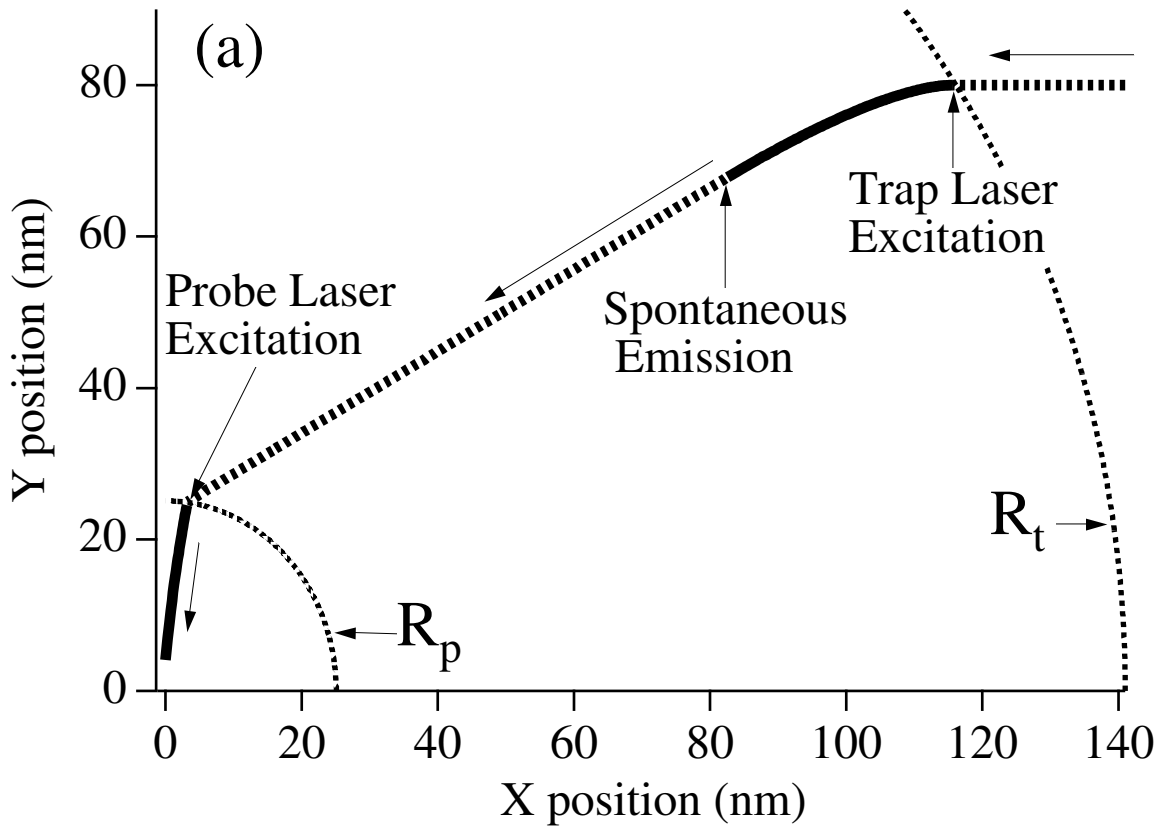

(a)
Y position (nm)
X position (nm)
0
20
40
60
80
100
120
140
Probe Laser
Excitation
Spontaneous
Emission
Trap Laser
Excitation
R_p
R_t

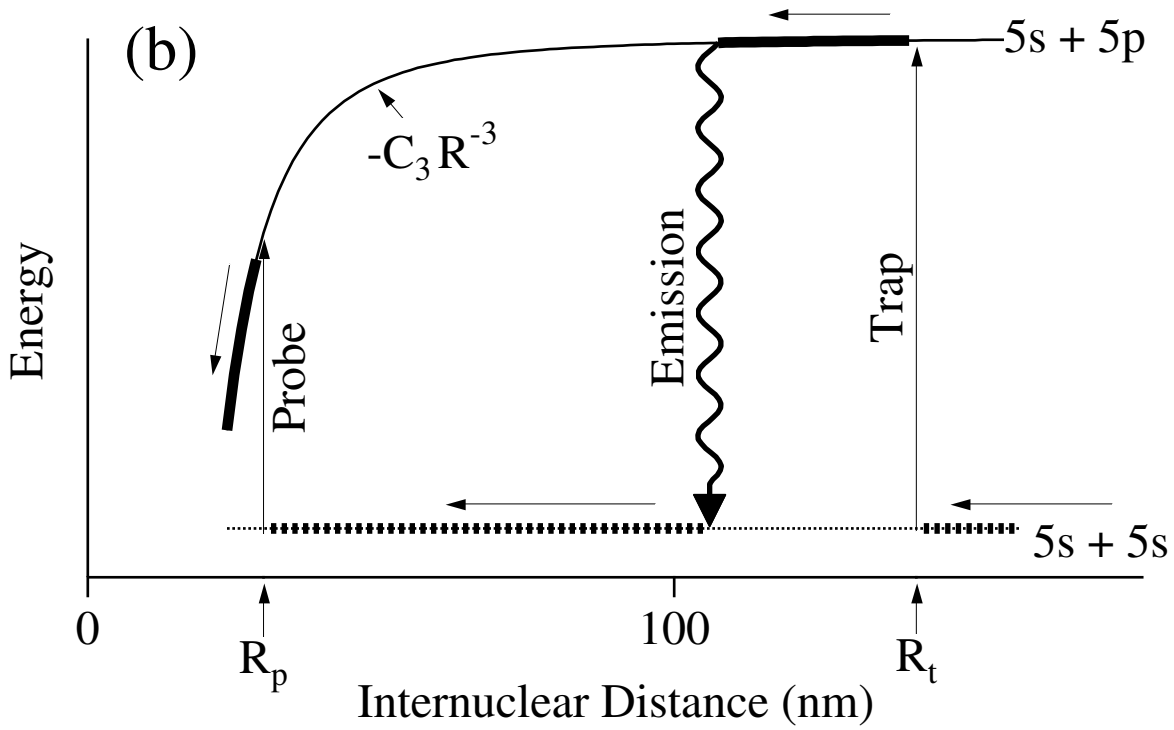


Figure 1: a) Typical classical trajectory of an atomic collision showing the flux enhancement effect. The solid (dashed) line indicates the atom's trajectory while in the excited (ground) state.The incoming atom approaches from the left. The atom pair is excited at R_t by the trap laser pulse and is accelerated by the attractive long-range potential. After spontaneous decay, it proceeds to R_p, where it may be excited again by a probe laser pulse. The atom pair is then accelerated quickly into short range, where either RE or ΔJ may occur, leading to trap loss. b) Molecular potential diagram for the same process.

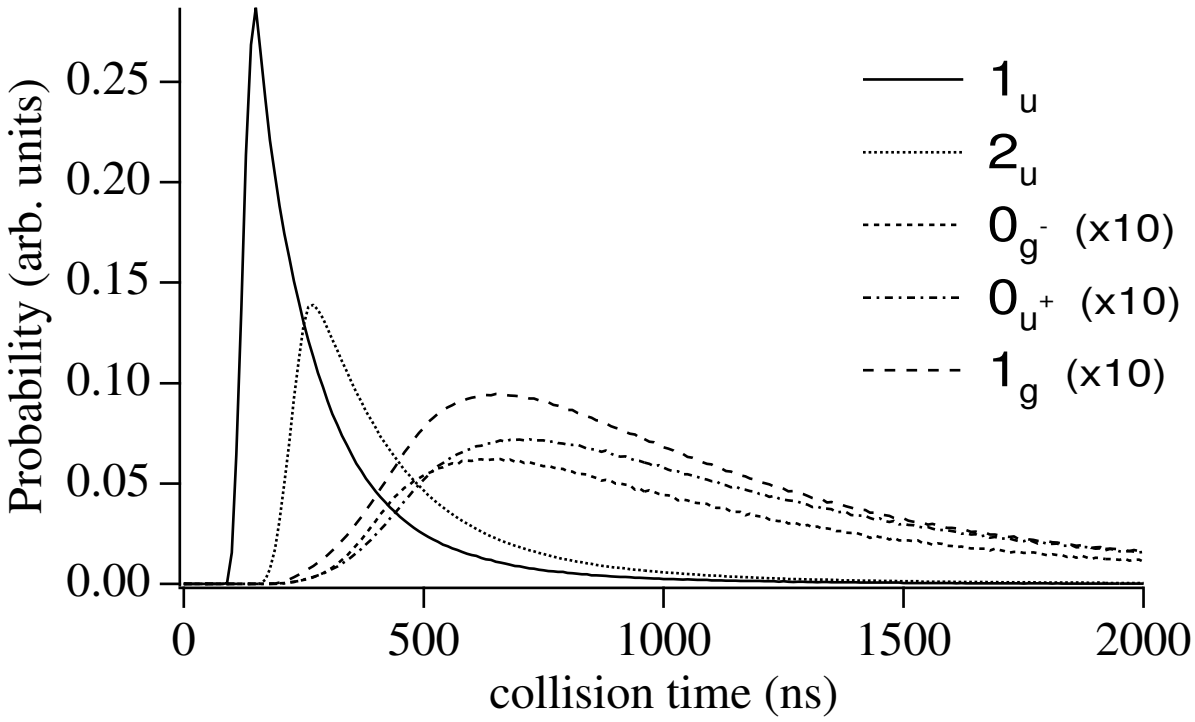
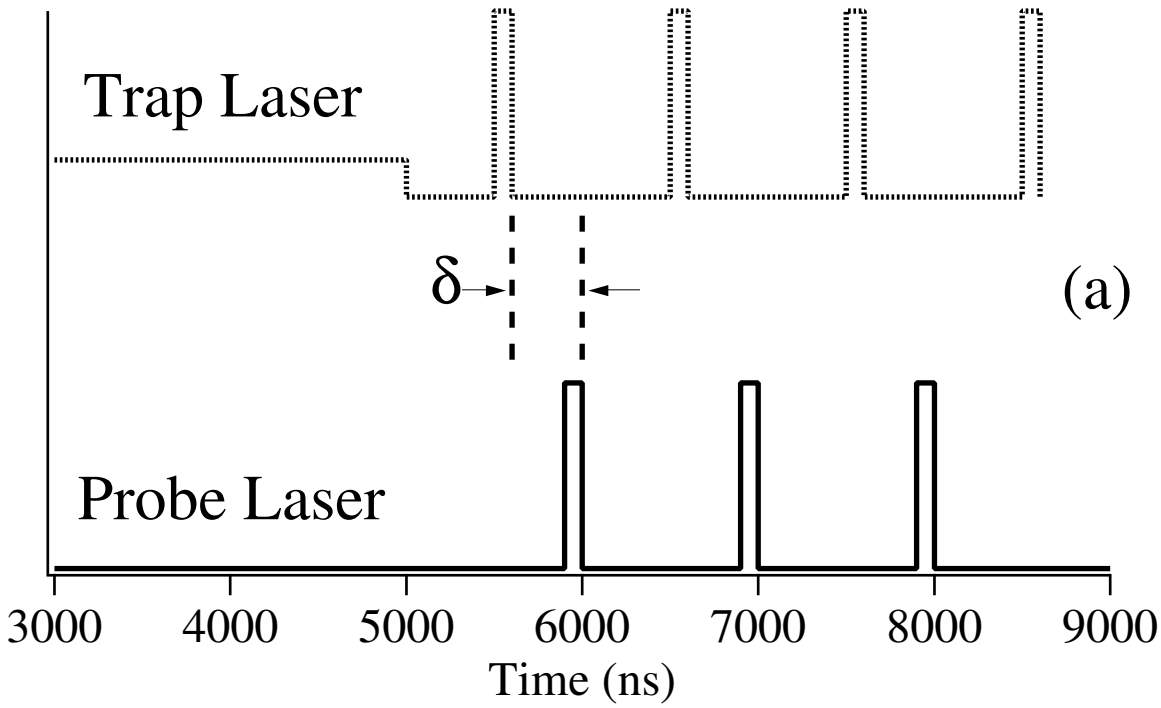


Figure 2: Classical simulation results for the time-resolved collision spectra at $T = 50\mu$K. The trap (probe) laser intensity and detuning 15.2mW/cm^2 (7W/cm^2) and $-1\Gamma(-169\Gamma)$, respectively. The five curves correspond to results using the C_3 and excited state lifetimes for each of the Hund's case (c) attractive molecular states. Plotted is the probability for flux enhancement to take place, as a function of the collision time (i.e., time to travel from R_t to R_p.)


Trap Laser
δ
(a)
Probe Laser
3000
4000
5000
6000
7000
8000
9000
Time (ns)

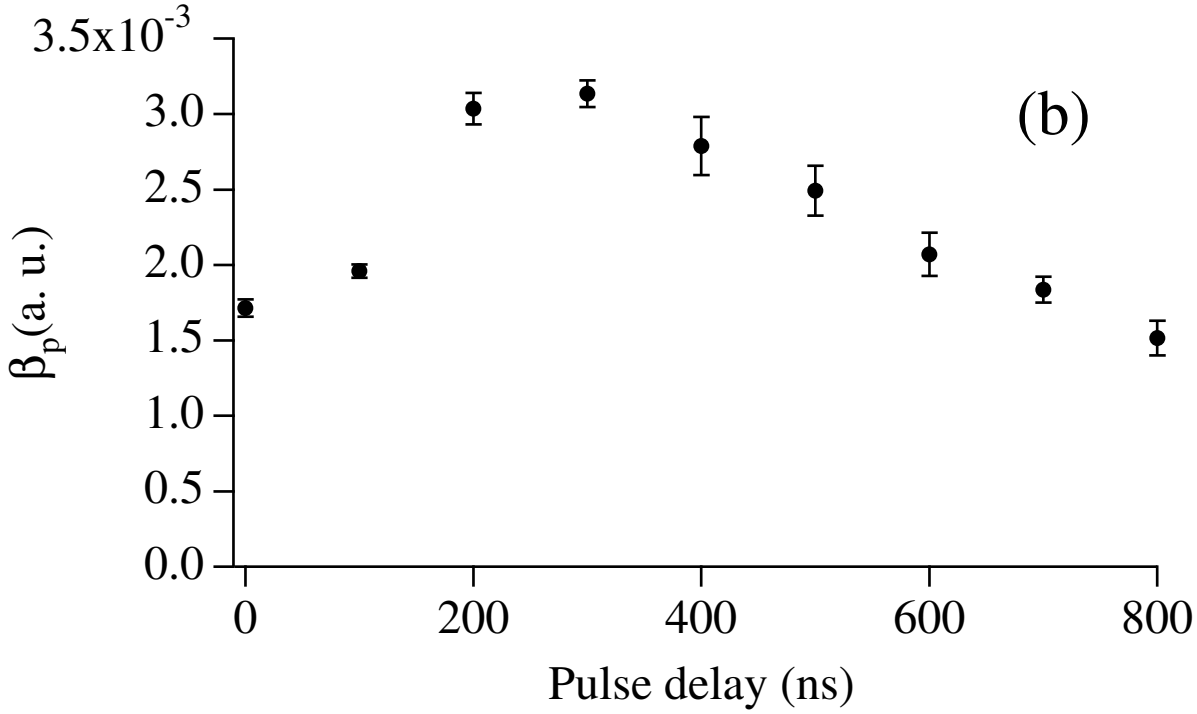


Figure 3: (a) Timing of the trap and probe laser pulses for the experiment. The trap laser is on at low (3.8mW/cm^2) intensity for 5 μ s. This is followed by a series of short (100ns), intense (15.2mW/cm^2) trap pulses. The probe pulses are 100ns long and are peaked at time δ after the peak of each trap pulse. The entire pattern repeats every 10μs. (b) β_p plotted as a function of δ. The flux enhancement effect increases only after the trap laser has been on for at least 200ns, indicating a minimum collision time of $\sim 200ns$. It then drops off slowly, in reasonable agreement with the simulations (Figure 2.)