# 2 Photon Transition

The Raman Team

Atom Chip Group

Gal Aviv, Amir Waxman, Meny Givon

# Schematic system & procedure

**87Rb + neon @ 7.5T**
**DC Magnetic field – 0.5G z**
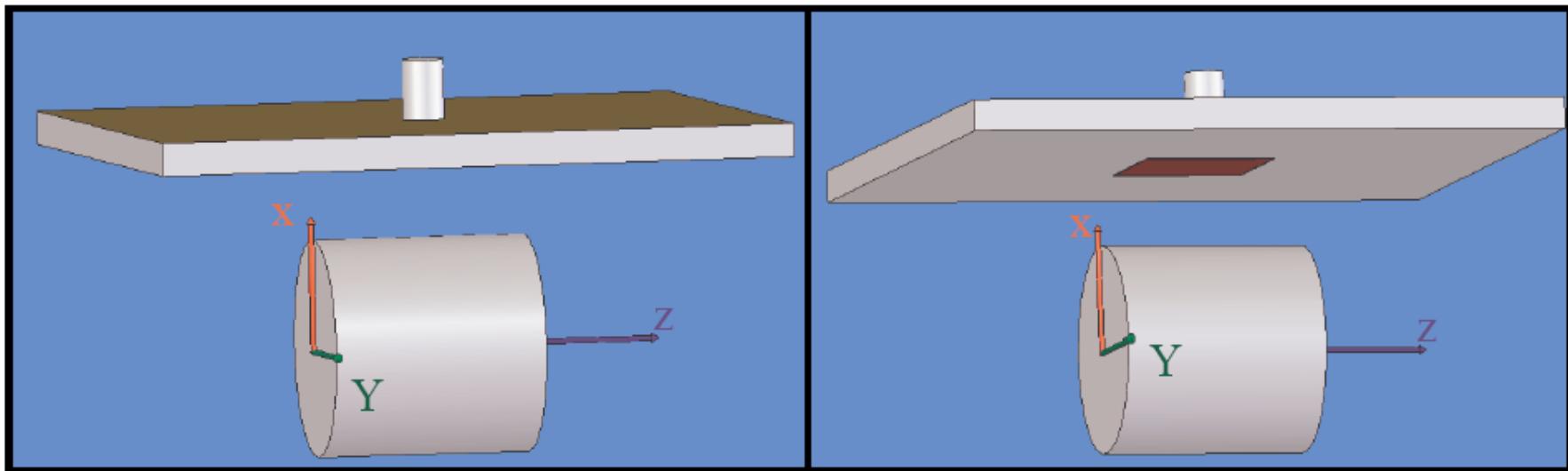


**Radiation:**

**MW: Linear polarization, B in the Z direction.**

**RF: Produced by coil (not shown) symmetry axis Z**

# What Are we doing…



**MW + RF Field**

**$B_Z$=0.5G**

# Finding Pressure shift



One photon Rabi freqency as a function of shift from clock transition

# Results…



Two-photon Rabi oscillations (RF freq.=250 KHz)

Population transfered to F=2

$\Omega = 2\pi \times 229.18 \pm 3.18$ Hz
to $= 1713.727 \pm 47.62$ microsec.

Time [microsec.]
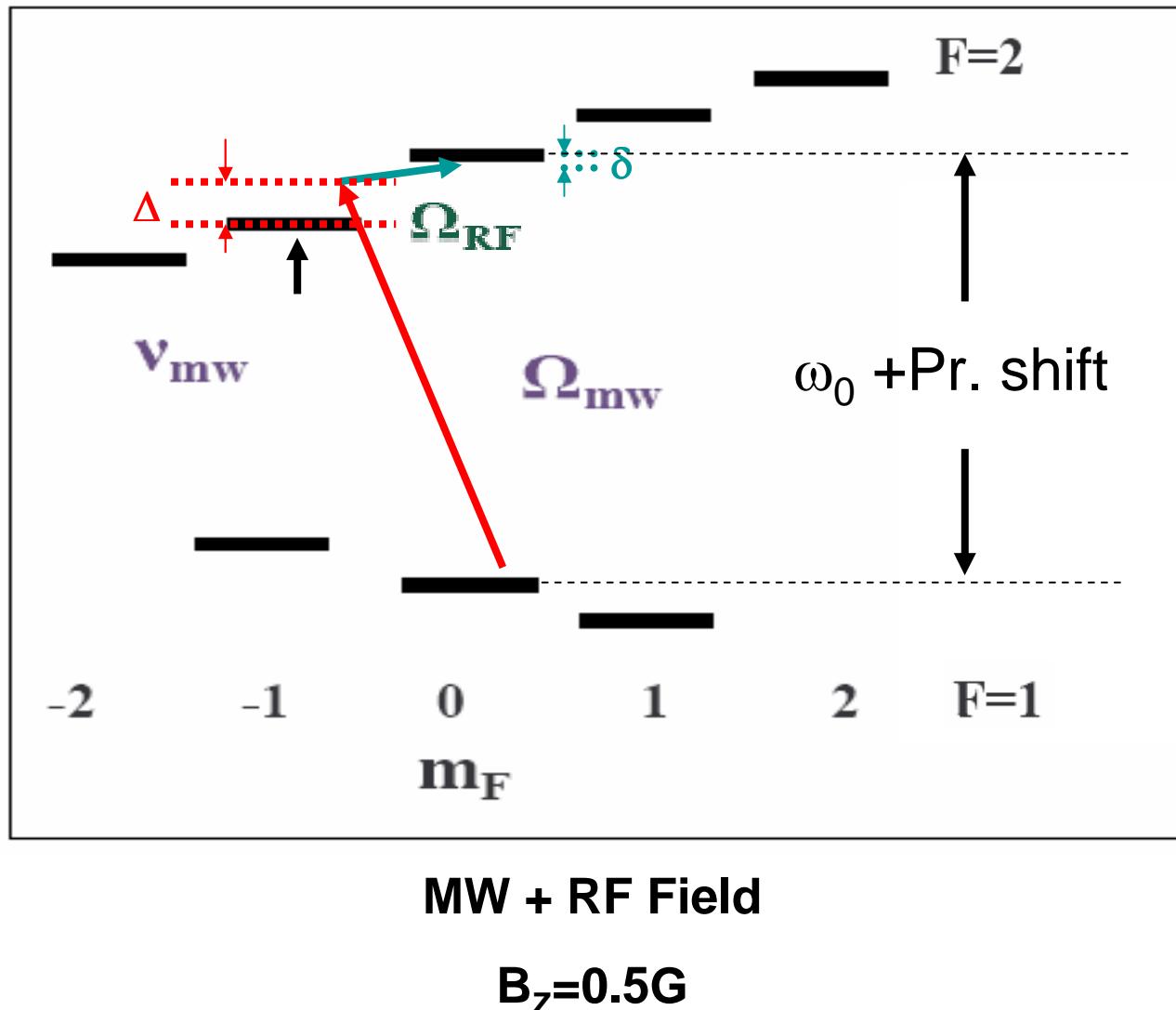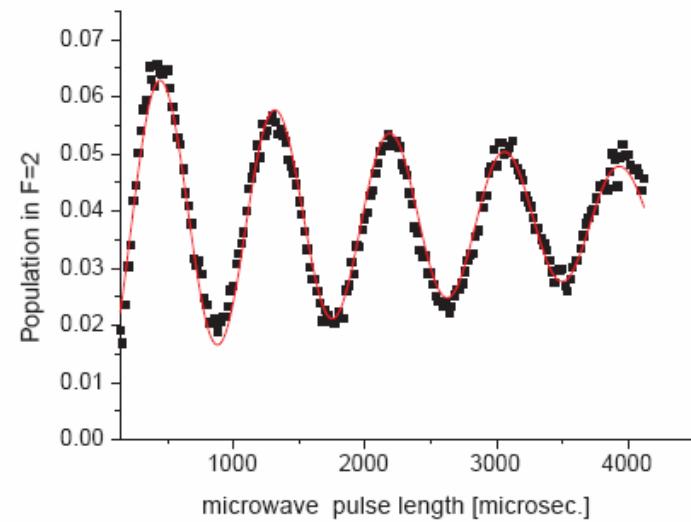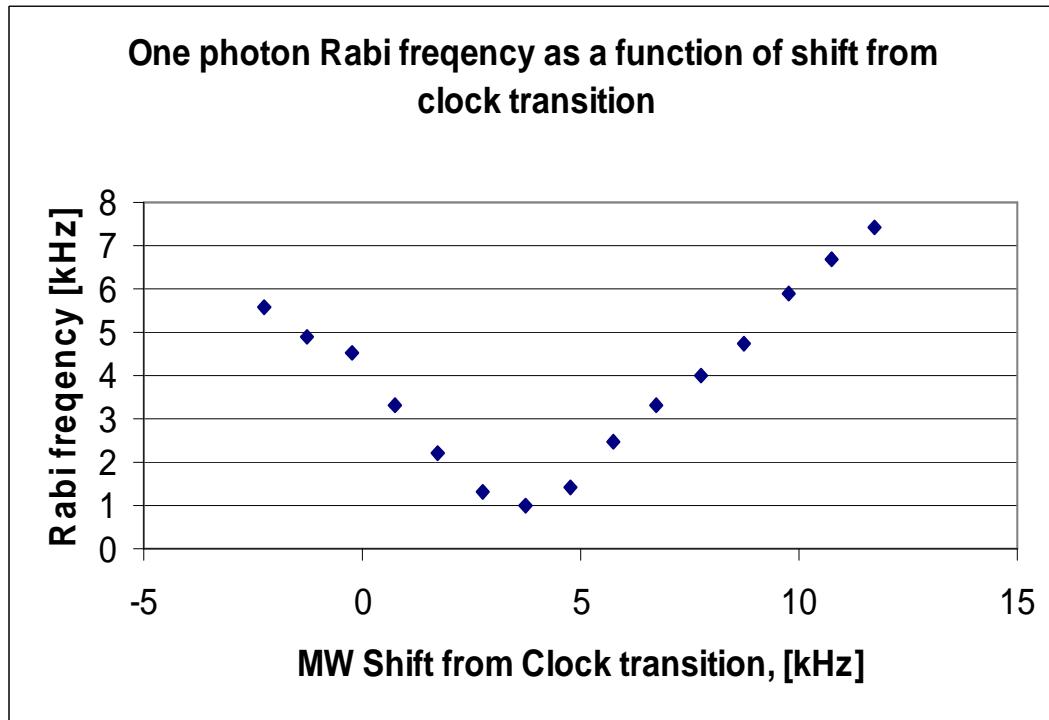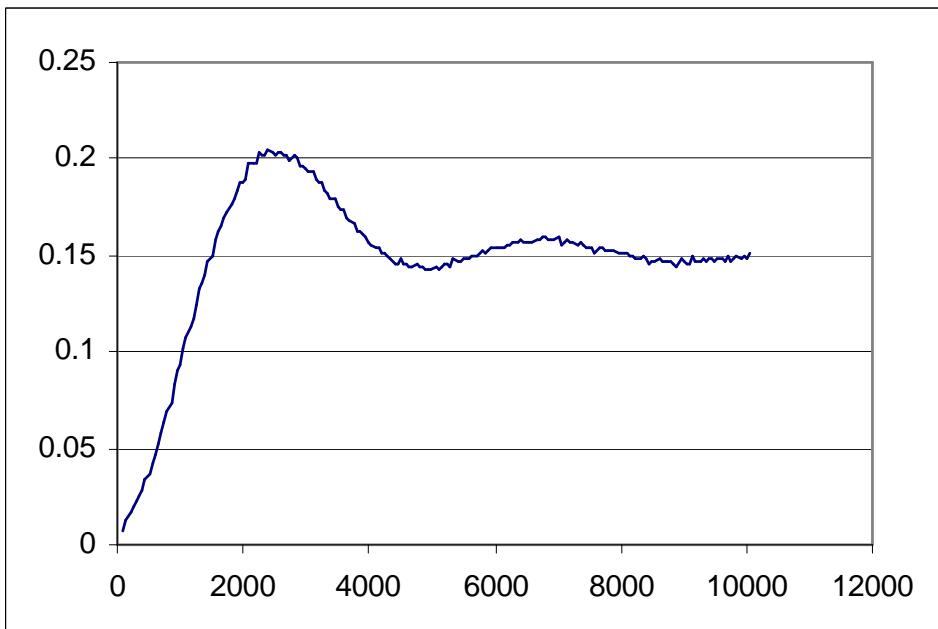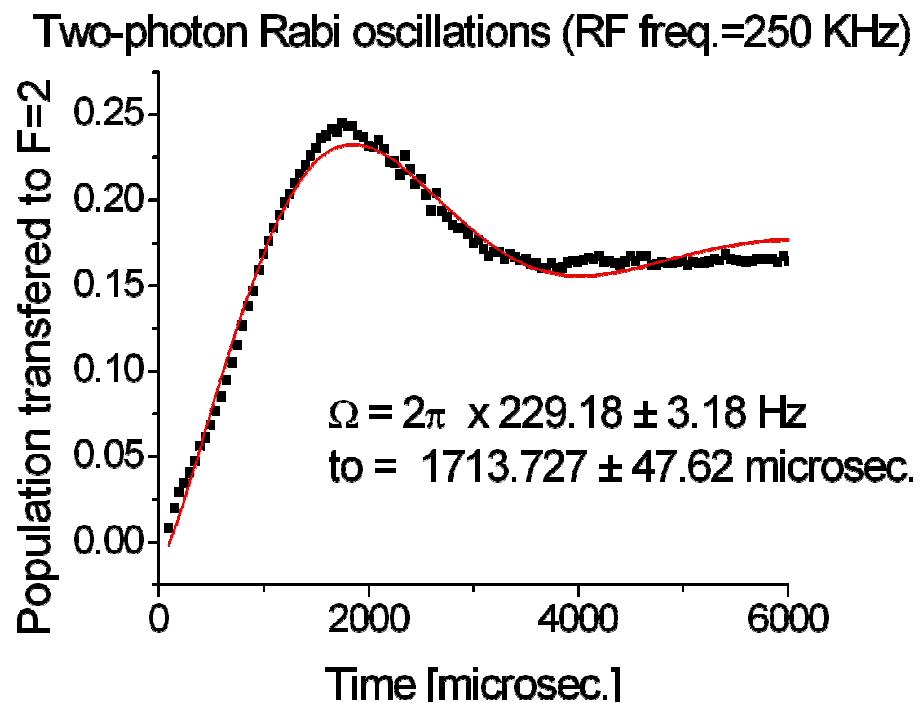
**$\Delta$=100KHz $\delta$=0Hz**

**$\Omega$R=2$\pi$ * 229.18Hz**

**$\Delta$=250KHz $\delta$=0Hz**

# Results…



Two-photon Rabi oscillations (RF freq.=252 KHz)

$\Omega = 2\pi \times 636.62 \pm 4.77$ Hz
to = 4338.38327 ± 537.21655 microsec.

Two photon Rabi oscillations (RF freq.=248 KHz)

$\Omega = 2\pi \times 474.2 \pm 3.18$ Hz
to = 5089.9 ± 623.13425 microsec.
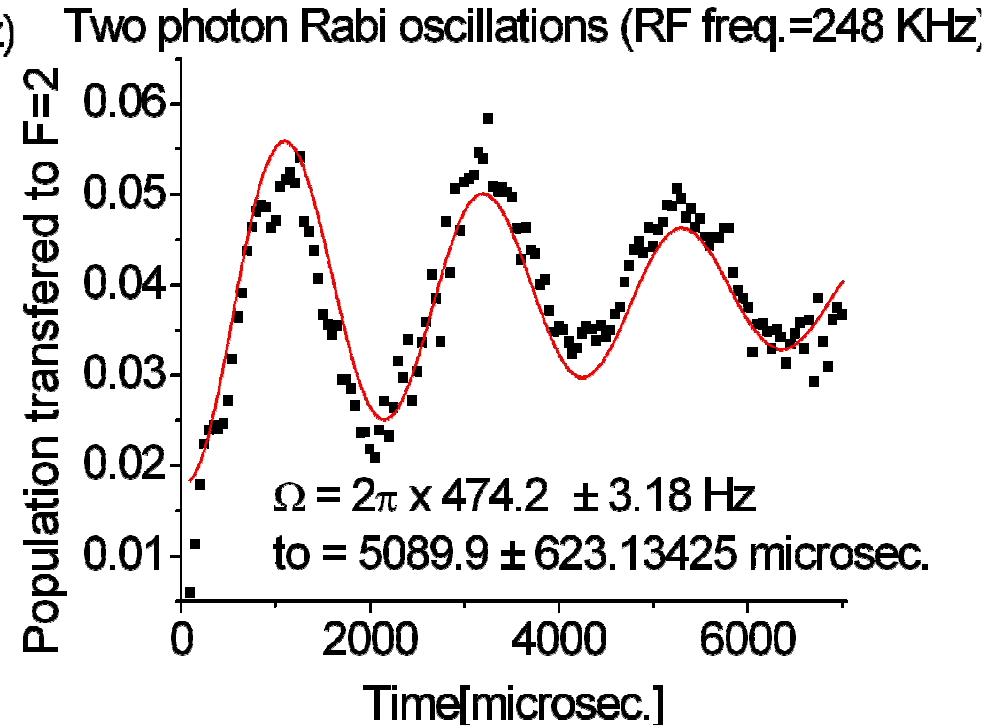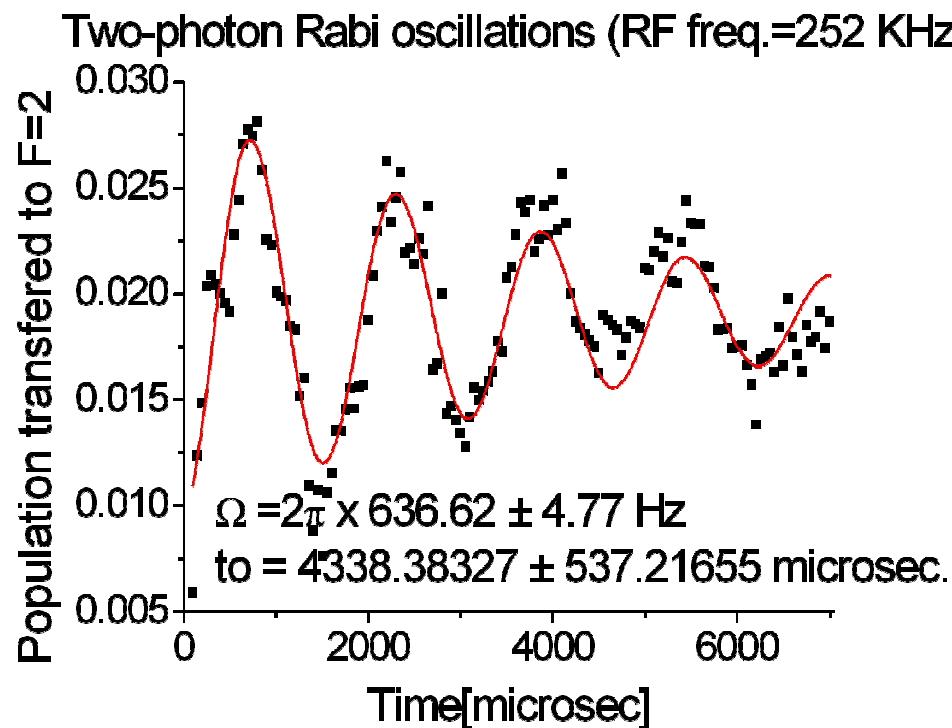
$\Delta$=100KHz $\delta$=2KHz

$\Omega_R$=2$\pi$ * 636.2Hz

$\Delta$=100KHz $\delta$=-2KHz

$\Omega_R$=2 $\pi$ * 474.2Hz

# MW ($\Delta$=100kHz) with no RF
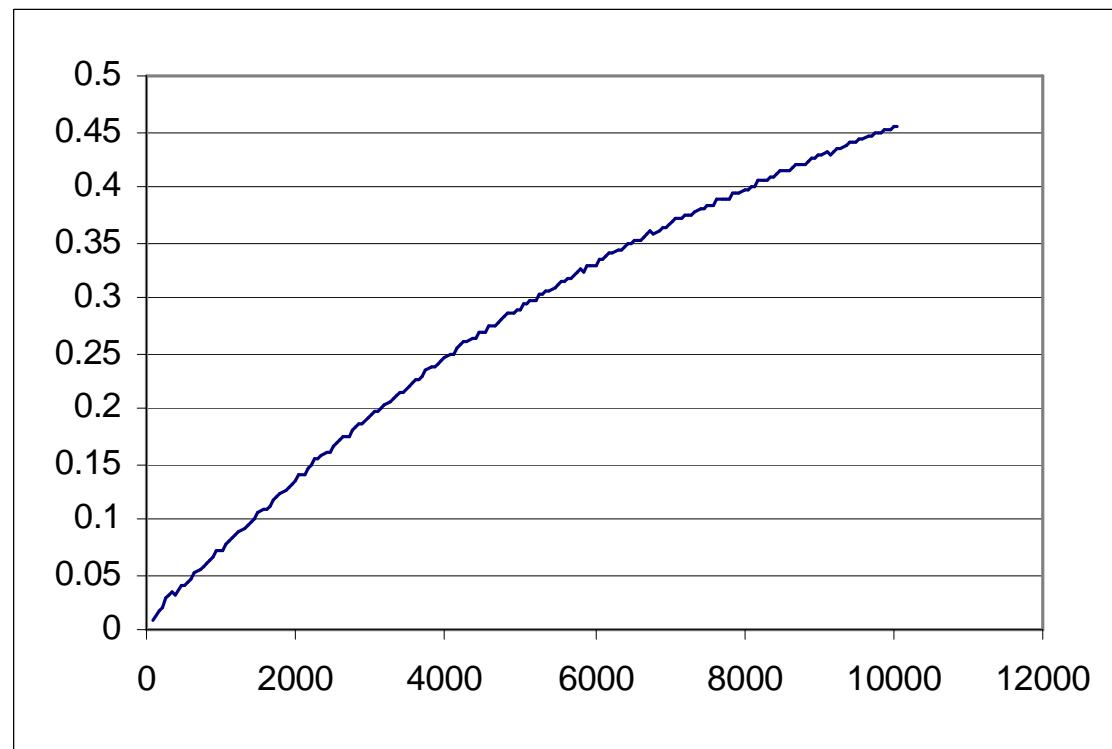
# Next steps

- Study more $\Delta$, $\delta$, $B_0$
- Study additional 2-photon transitions "Reichel type" transition
- Prepare to repeat in cold atoms

# We are starting with….
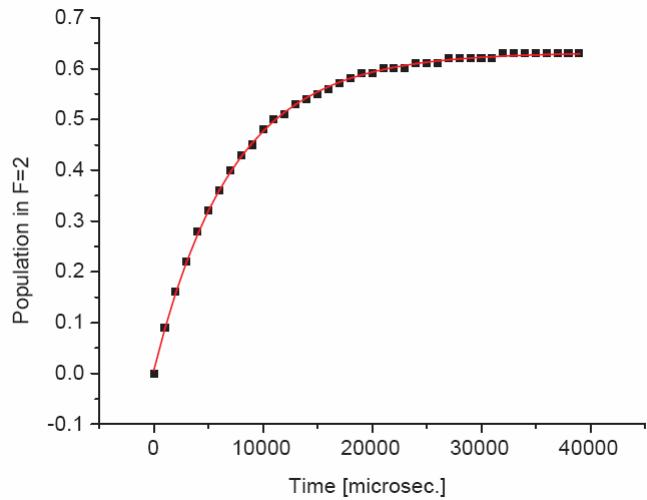


**Thermal behavior of atoms**
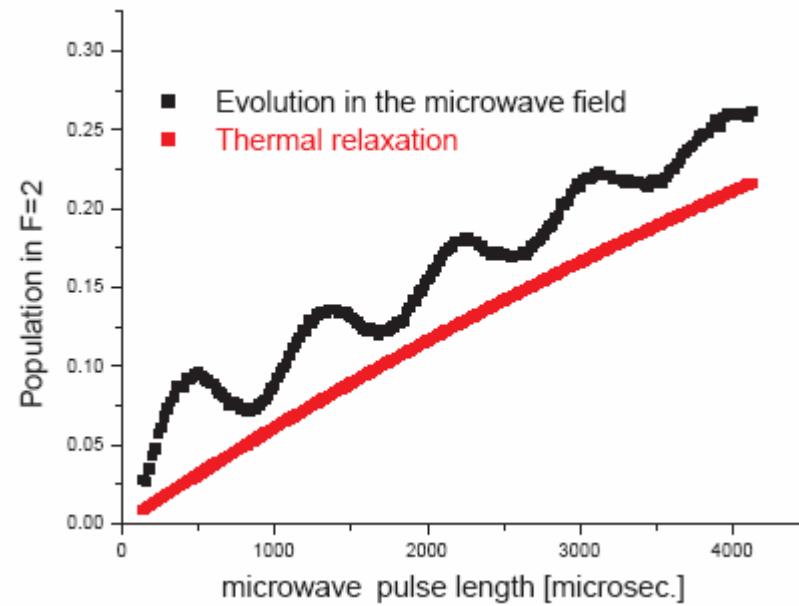


**The |1,0> to |2,0> Clock Transition**