

Raman transition on single Cesium Atom

Yichao Yu

Ni Group/Harvard

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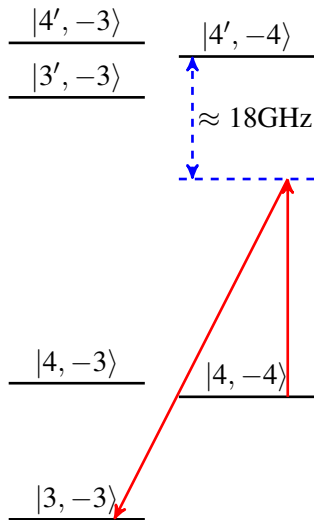
Raman resonance

$$\frac{|4', -3\rangle}{|3', -3\rangle} \quad \frac{|4', -4\rangle}{|3', -4\rangle}$$

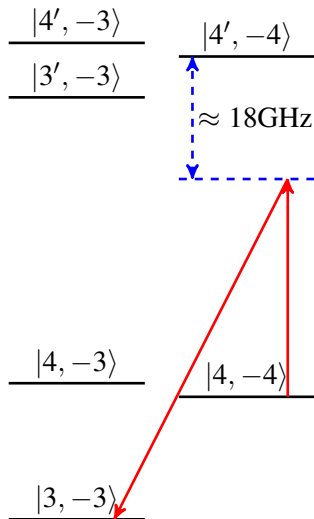
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Raman resonance



Raman resonance



- Use single atom

- Light

Power:

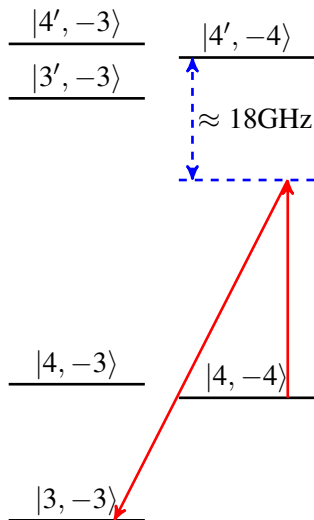
Frequency:

- State

Dark state pumping ✓

Cycling transition detuning ✓

Raman resonance



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- Power:

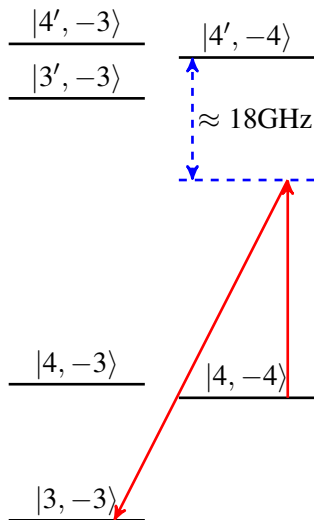
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Raman resonance



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- ▶ Power:

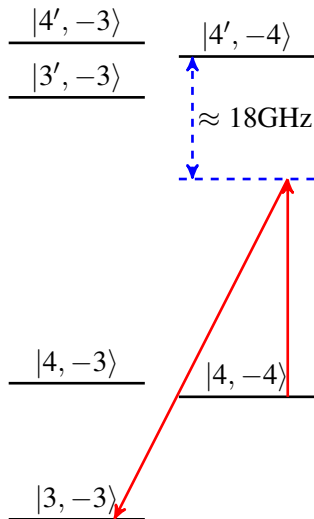
- ▶ Frequency:

- State

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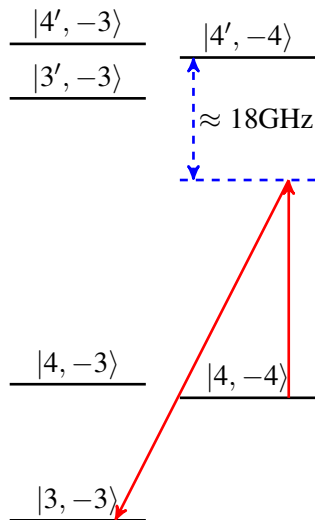
Cycling transition detuning ✓

Raman resonance



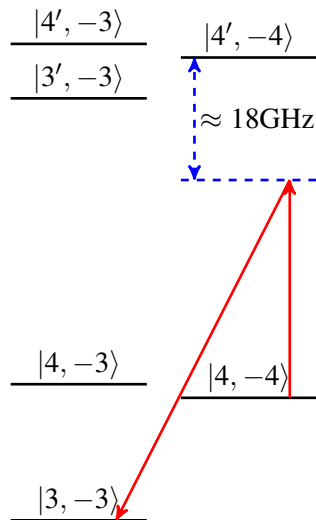
- Use single atom
- Light
 - ▶ Power: Alignment and scattering measurement ✓
 - ▶ Frequency:
- State
 - Dark state pumping ✓
 - Cycling transition detuning ✓

Raman resonance



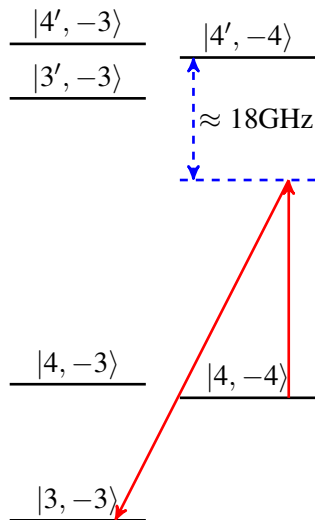
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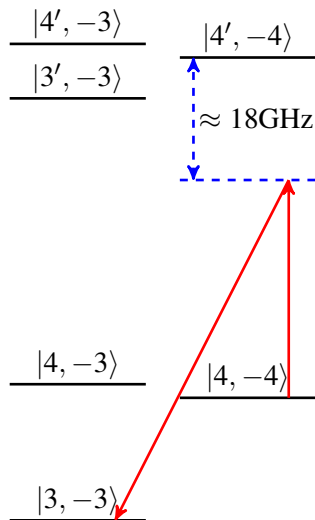
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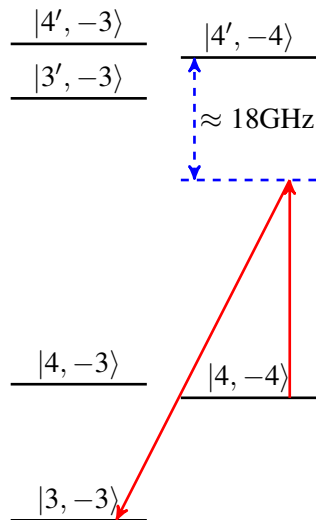
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Raman resonance



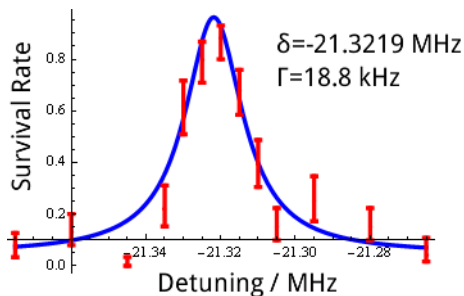
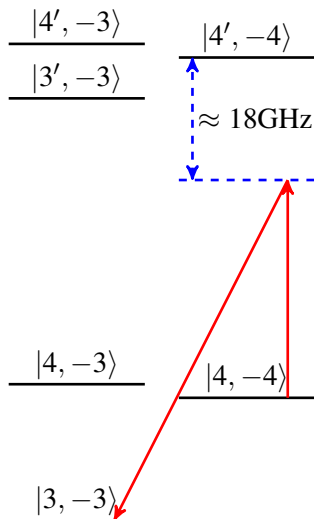
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Raman resonance



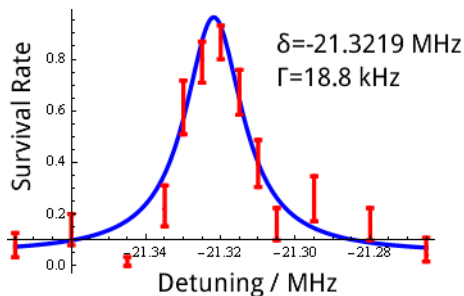
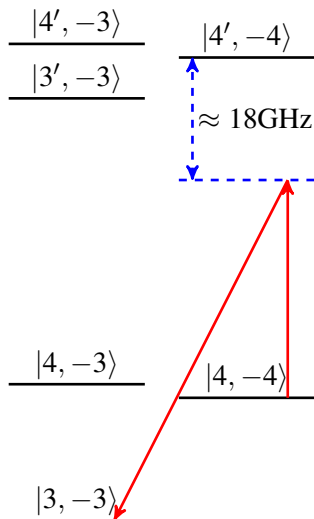
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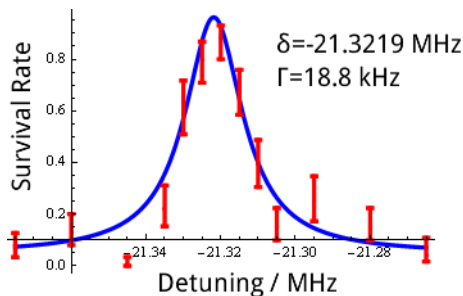
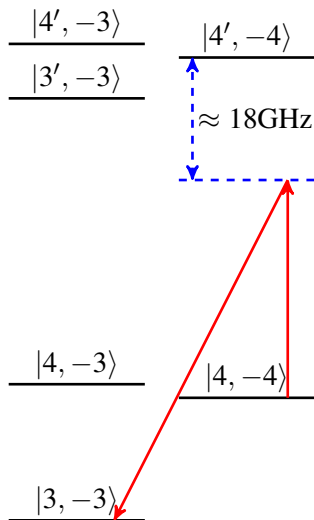
- Zeeman shift $\approx 21\text{MHz}$
- Red shifted (and wider) with higher Raman intensity

Raman resonance



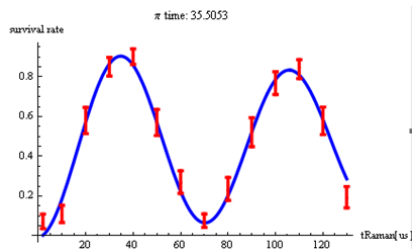
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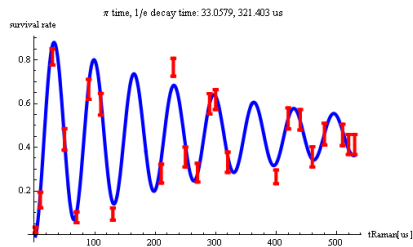
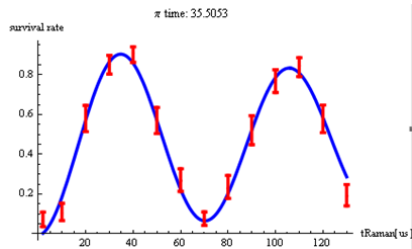


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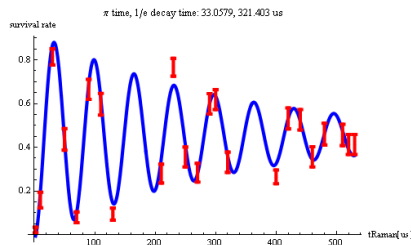
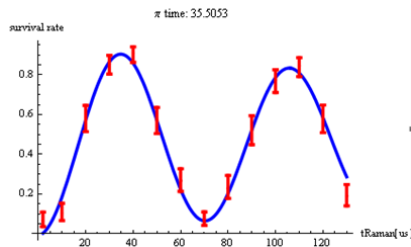
Rabi flopping



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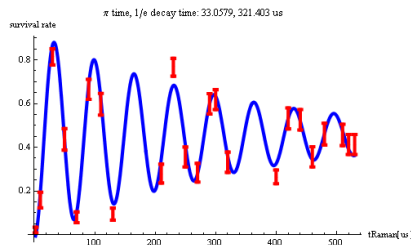
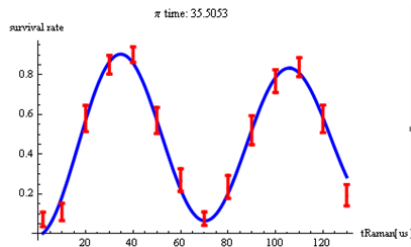
Rabi flopping



Next

- More characterization (Power, heating, decoherence)
- Drive sideband

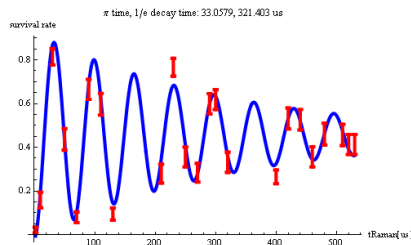
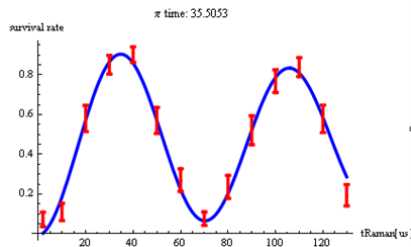
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