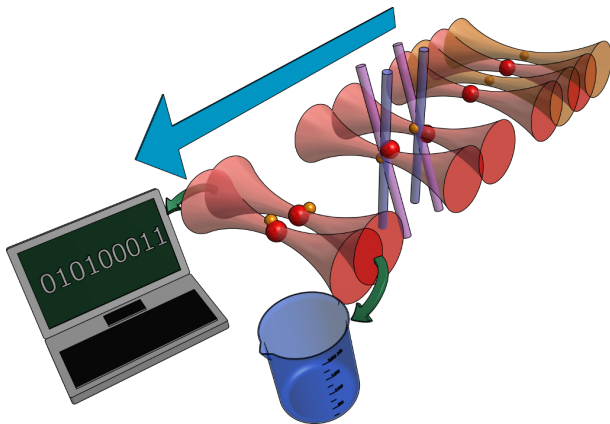


Trapping and imaging of single atom in the presence of light shift



Yichao Yu
May 26, 2016
Ni Group/Harvard

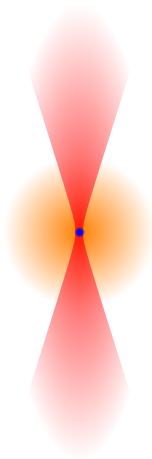
Procedure

- MOT Loading
- Trapping
- Imaging
- Works for Cs



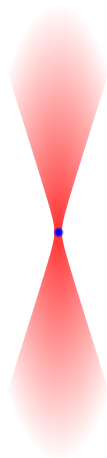
Procedure

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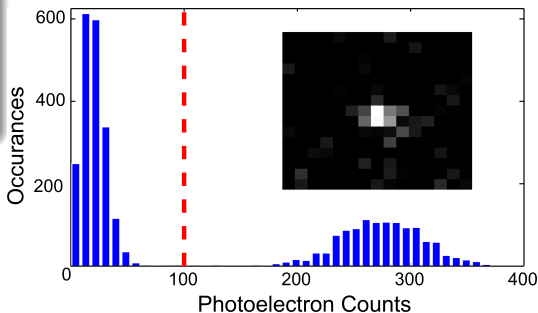
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Procedure

- MOT Loading
- Trapping
- Imaging
- Works for Cs



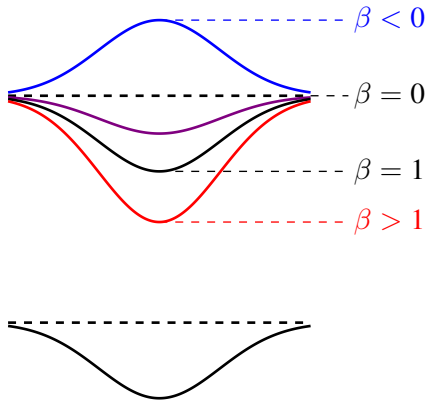
Light shift

- $\beta = \frac{\alpha_e}{\alpha_g}$
- Inefficient cooling;
Heating
- Shift imaging light out of resonance



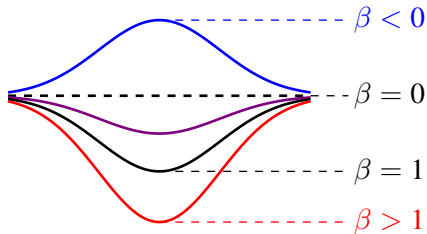
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Light shift

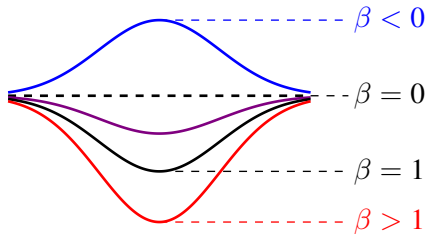
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Atom	Cs			Na
λ_{trap}	922	935	970	700
β	2	1	0.6	-1

Light shift

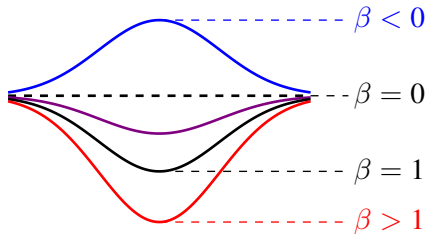
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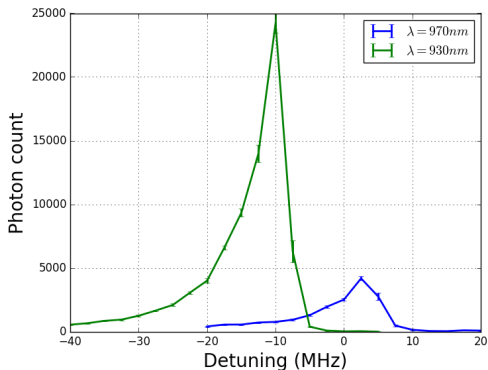
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Cs single atom loading

λ_{trap}	922	935	970
Loading	No	Yes	Yes

Cs single atom imaging



Solution

- Trap switching
- Out-of-phase resonant and trap light
- Switching frequency

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