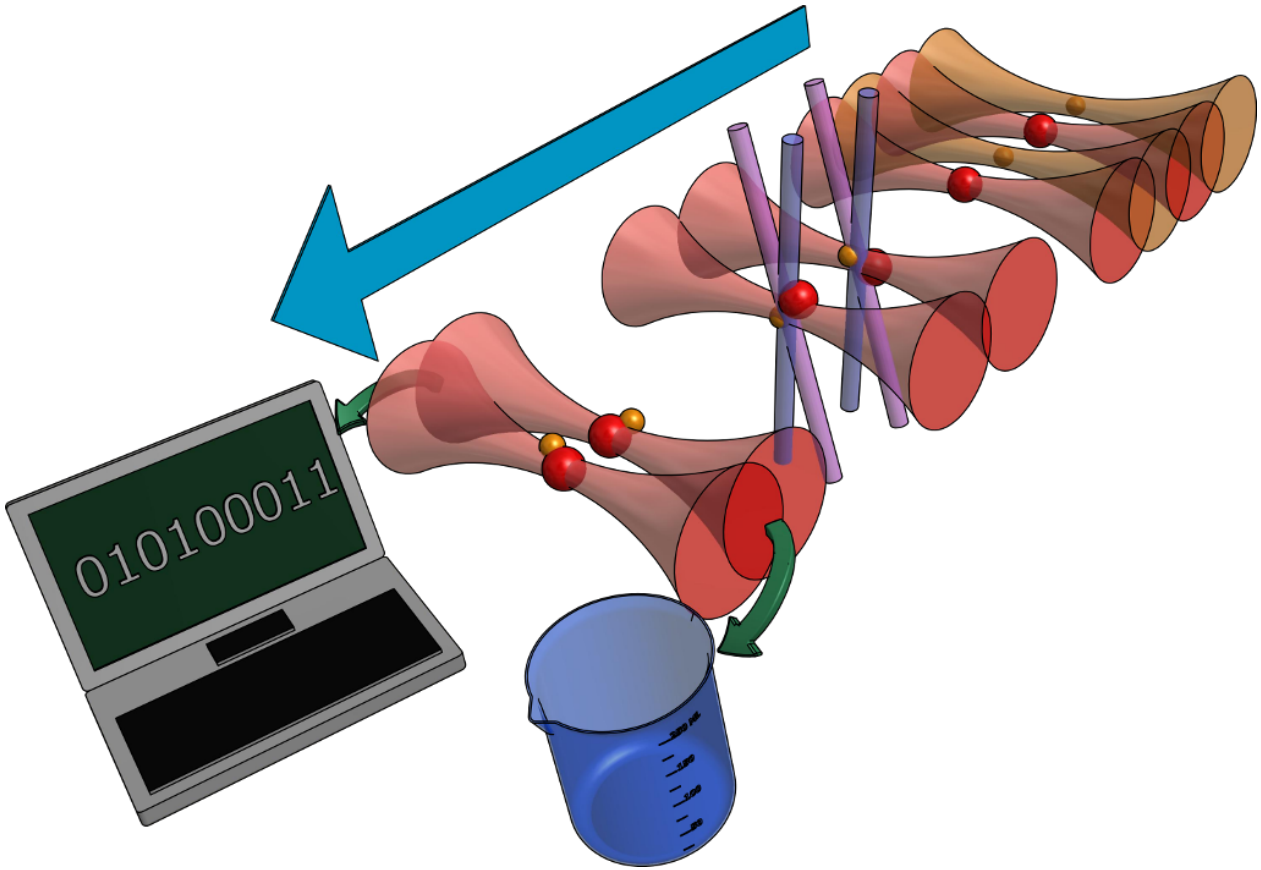
# Trapping and imaging of single atom in the present of light shift




Yichao Yu
May 26, 2016
Ni Group/Harvard

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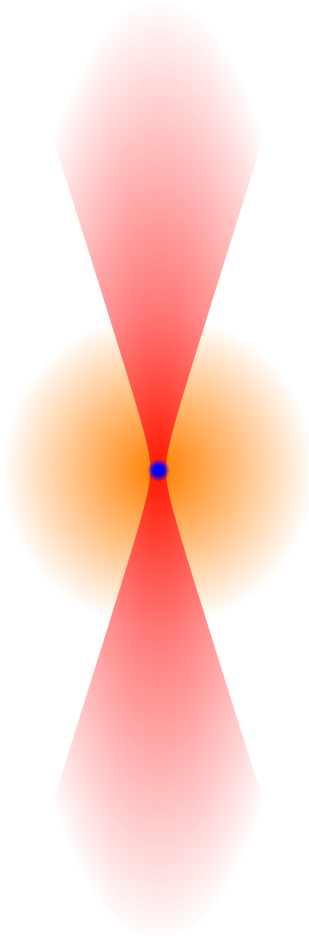

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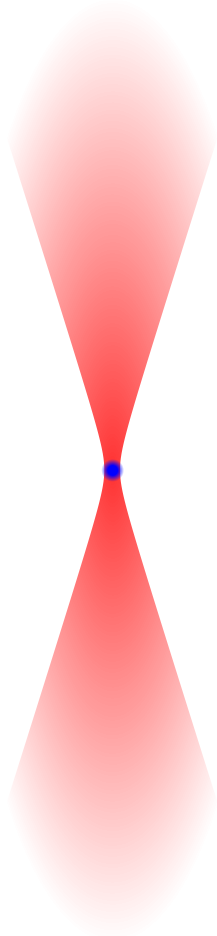

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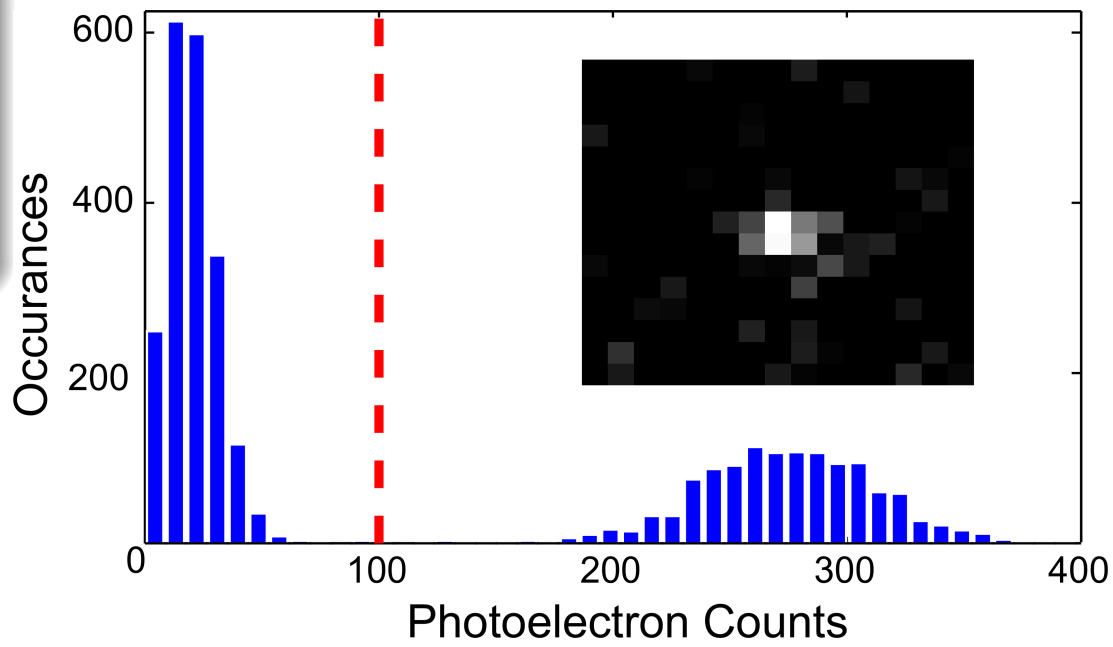
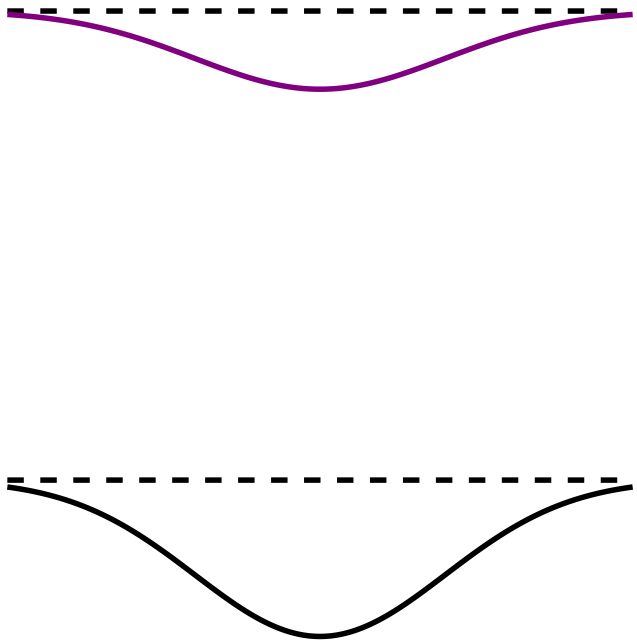


## Light shift

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



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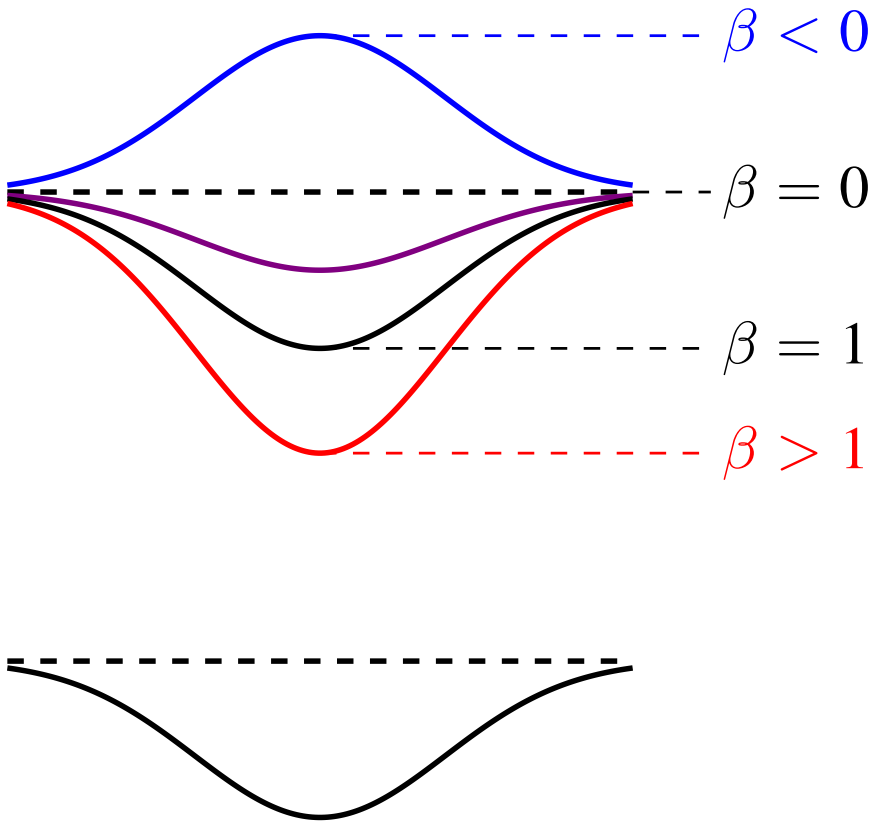

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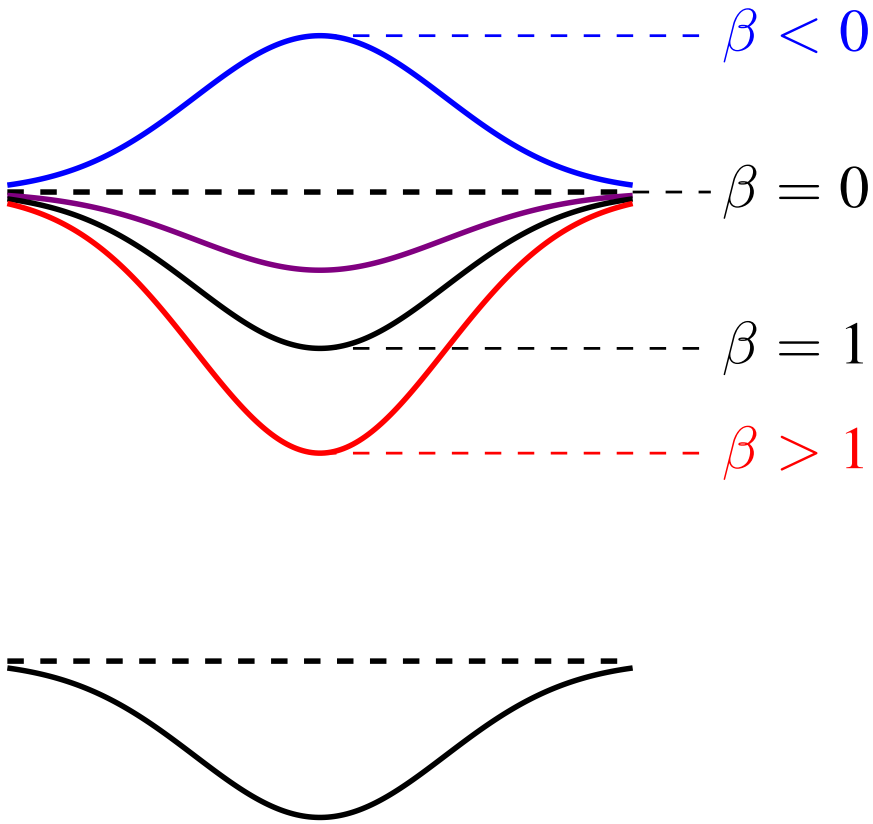


| Atom | Cs | | | Na |
|---|---|---|---|---|
| $\lambda_{trap}$ | 922 | 935 | 970 | 700 |
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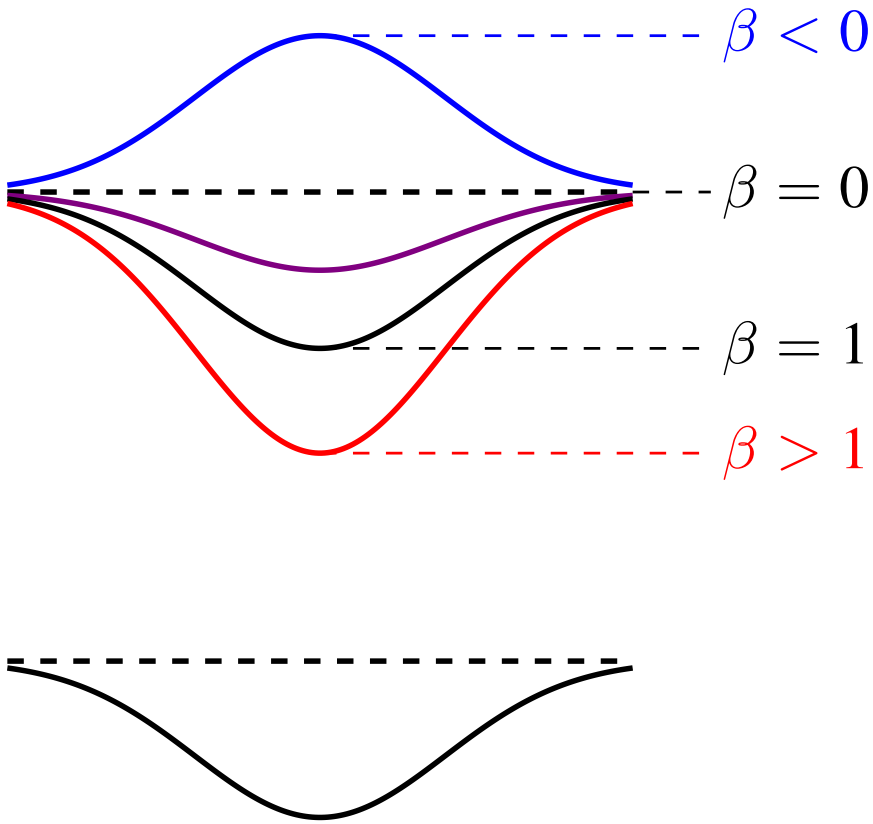


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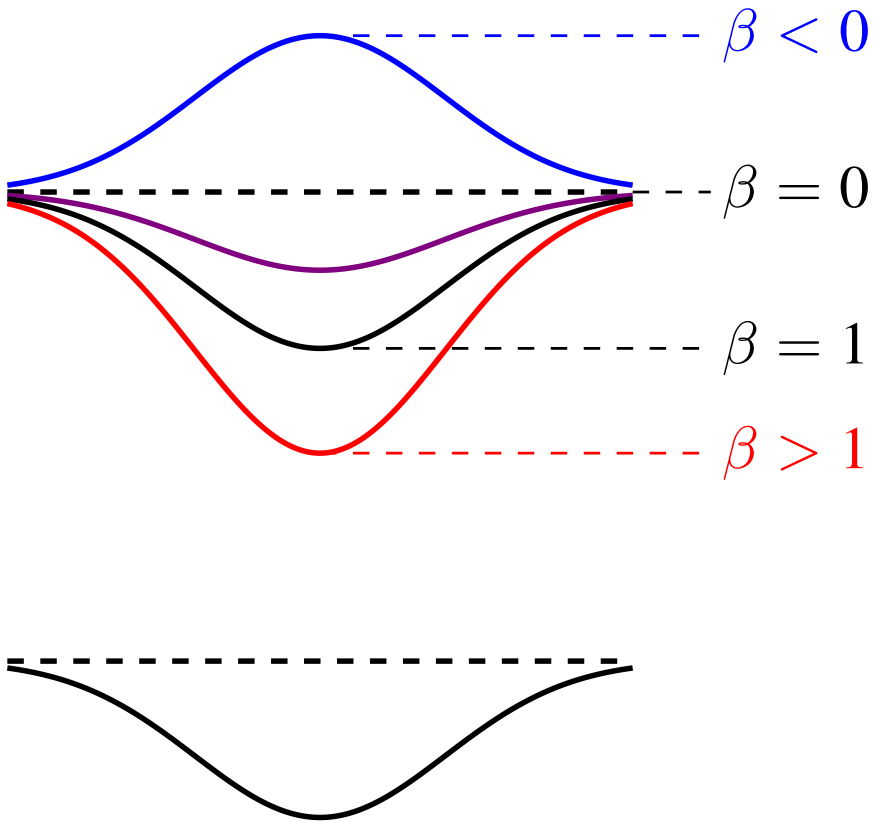


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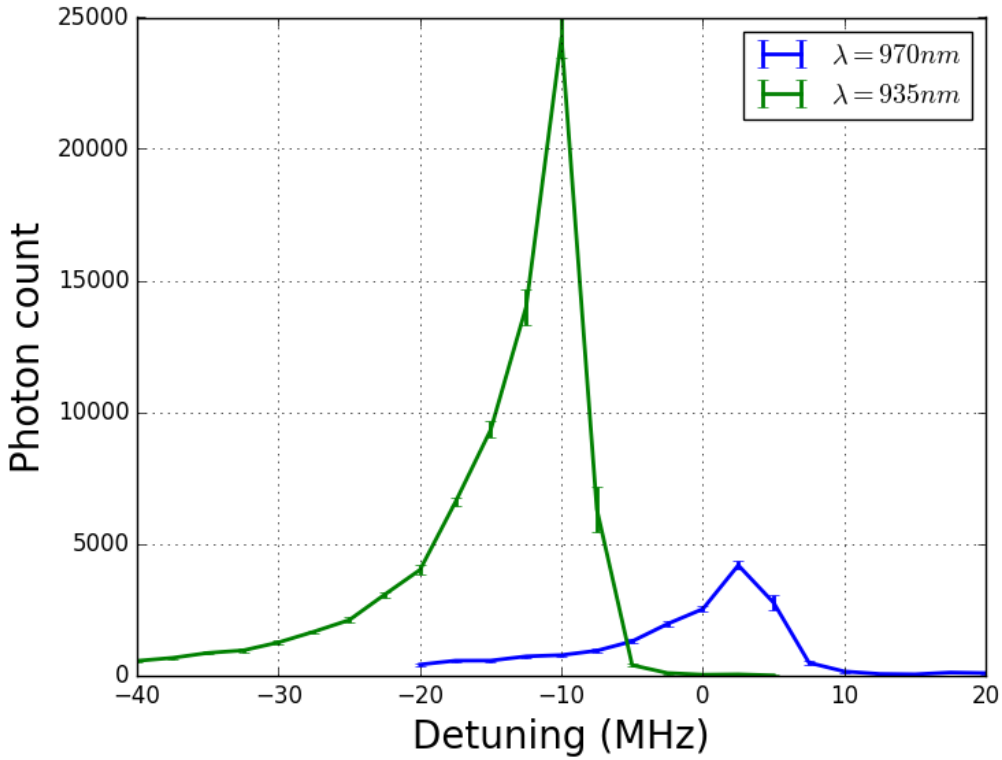
Cs single atom loading

| $\lambda_{trap}$ | 922 | 935 | 970 |
|---|---|---|---|
| Loading | No | Yes | Yes |

Cs single atom imaging



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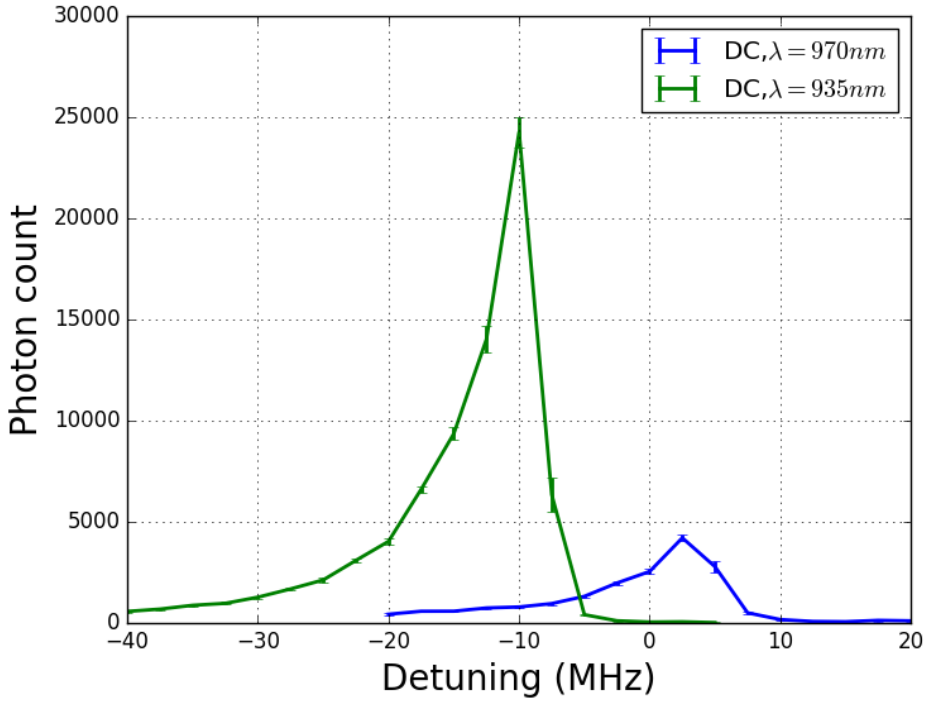

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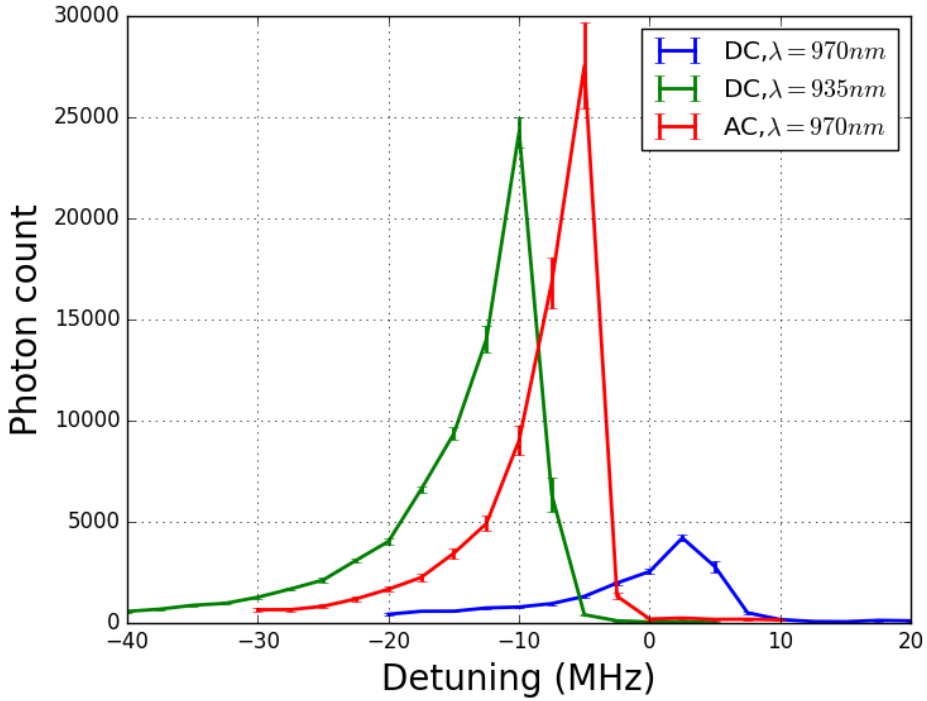

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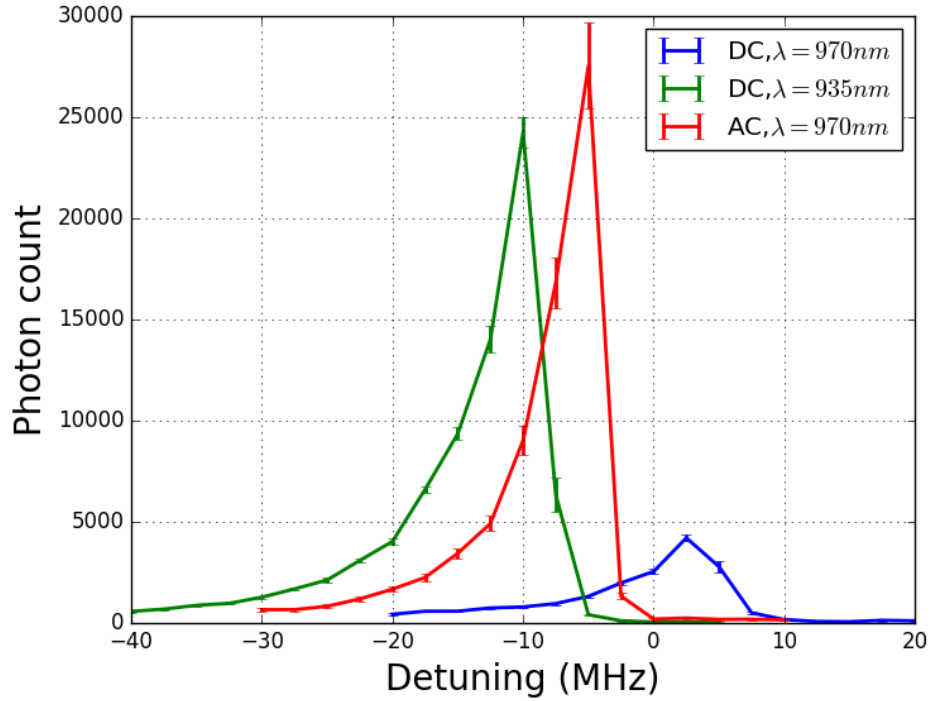


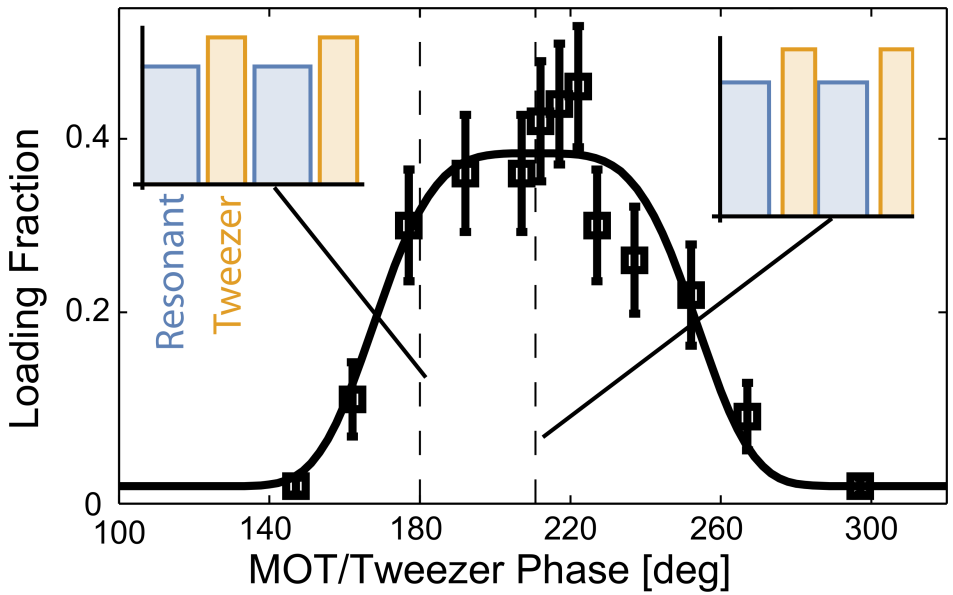

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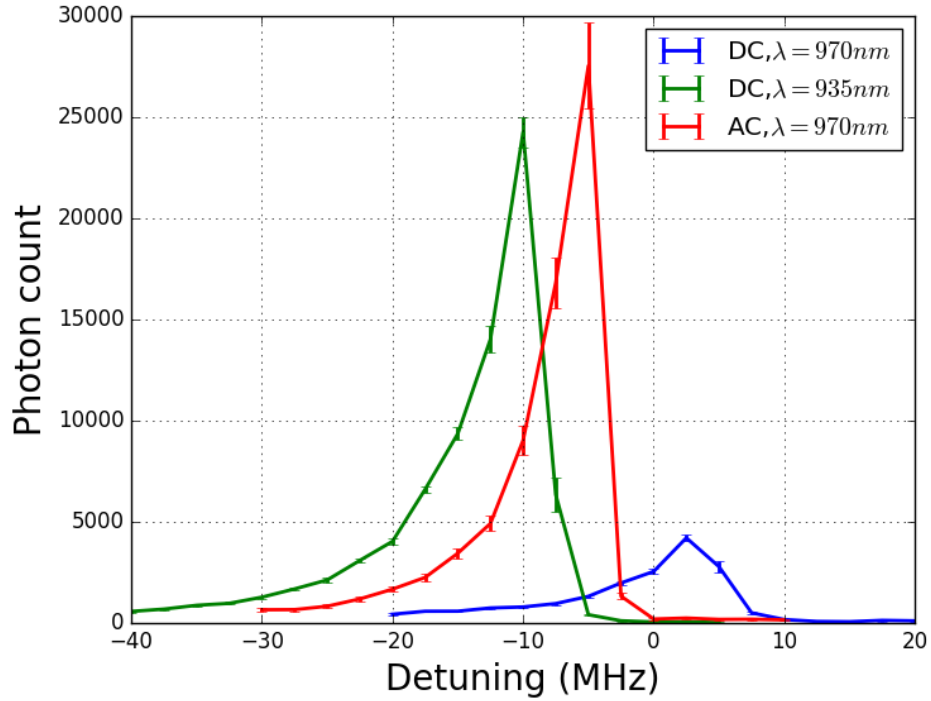


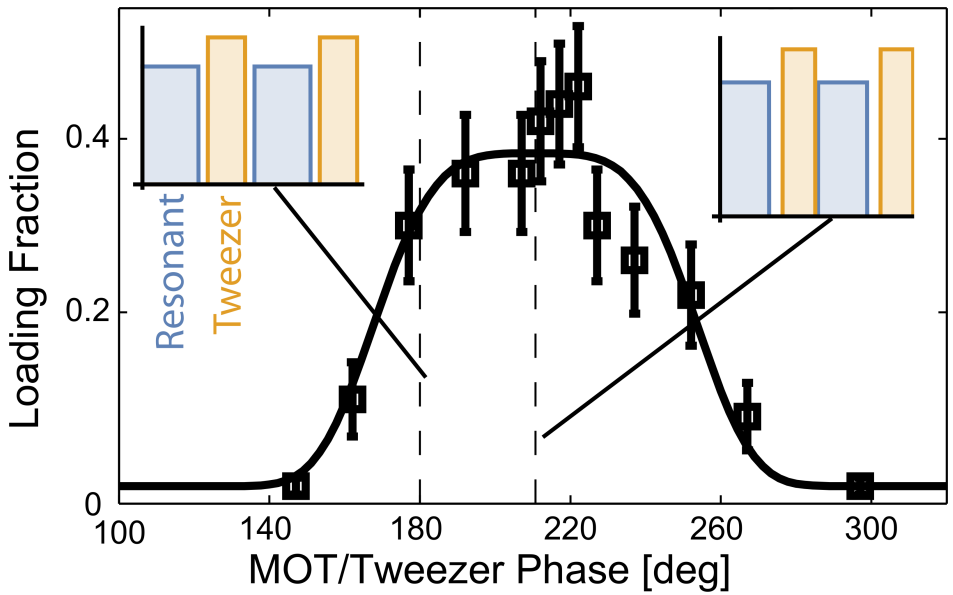

# Conclusion

- Measured the effect of light shift on loading and imaging of single atom
- Overcome the light shift by alternating trapping and resonant light to achieve loading of single Na atom.