# Optical Pumping

Yichao Yu

MIT

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- Atom state preparation.
- Laser cooling and trapping.

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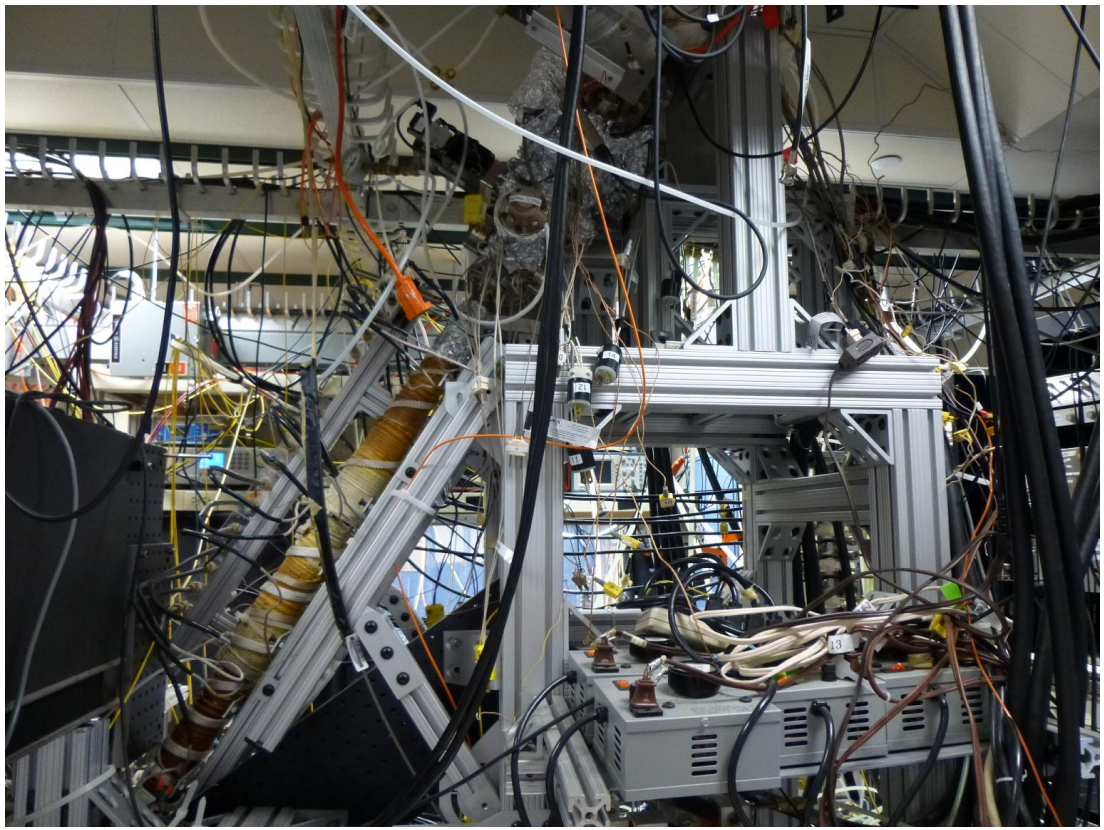


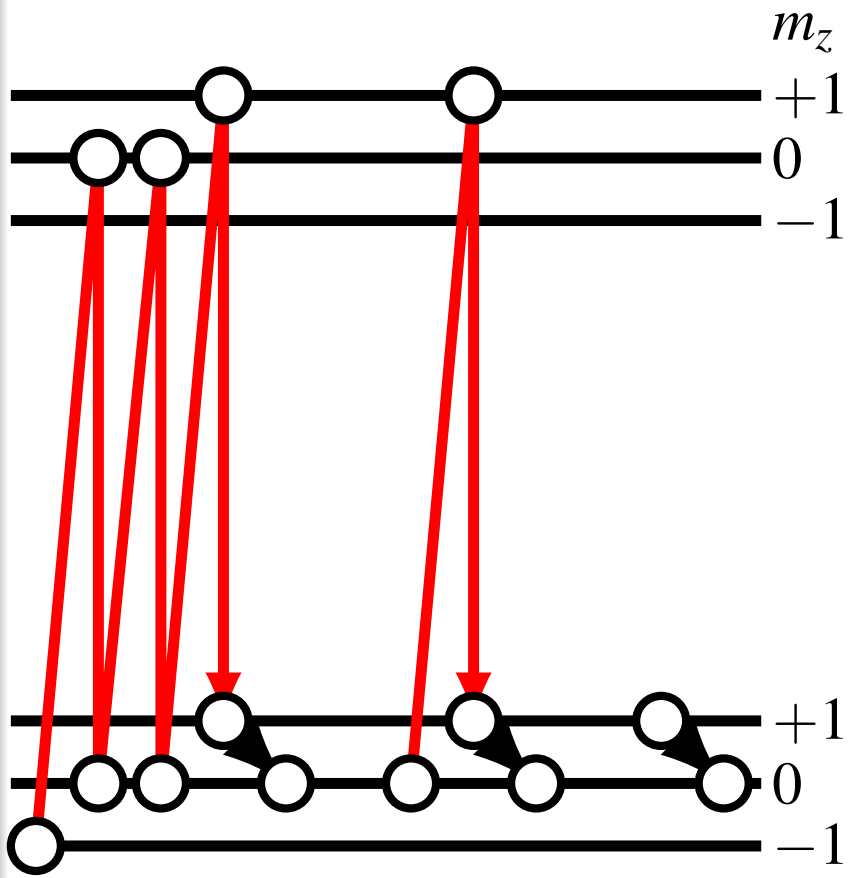
1. Atom energy levels and optical pumping.
2. Apparatus and measurement.
3. Data and result.
4. Conclusion.

- Fine, hyperfine structure, Zeeman splitting.

$$n \propto \mathbf{e}^{-\beta E}$$

- Optical pumping in $m_z$ states.
  Circular polarization light,
  $\Delta m = +1$.
  Spontaneous emission,
  $\Delta m = 0, \pm 1$.
- Dark state.
- Depolarization using RF signal.

$$\mu B = hf$$



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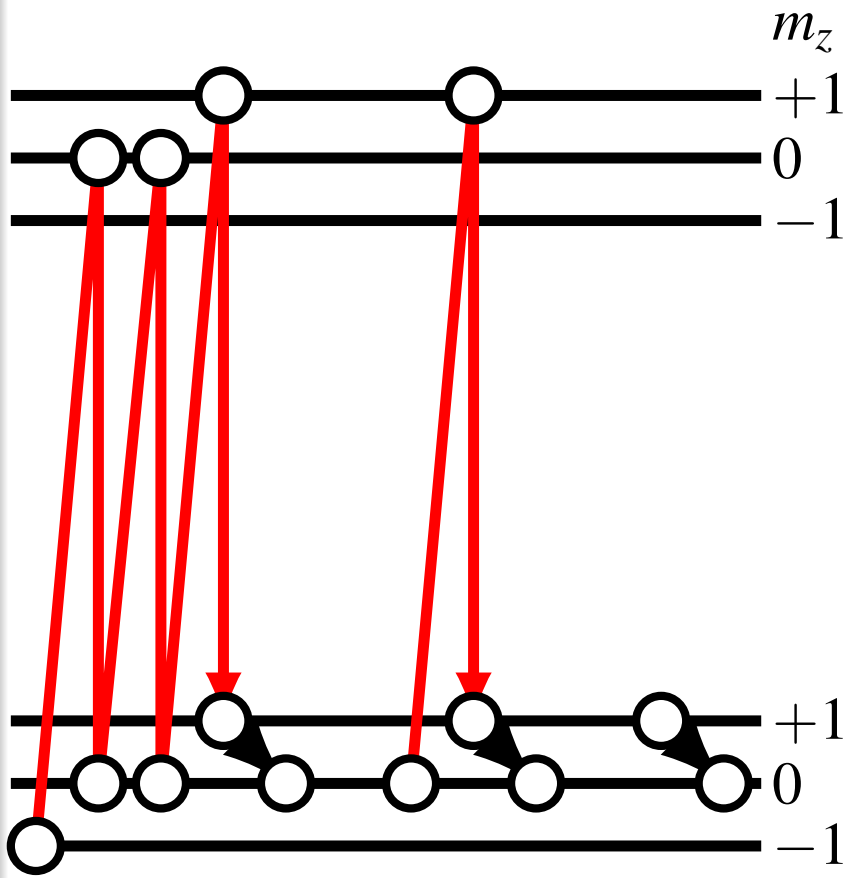

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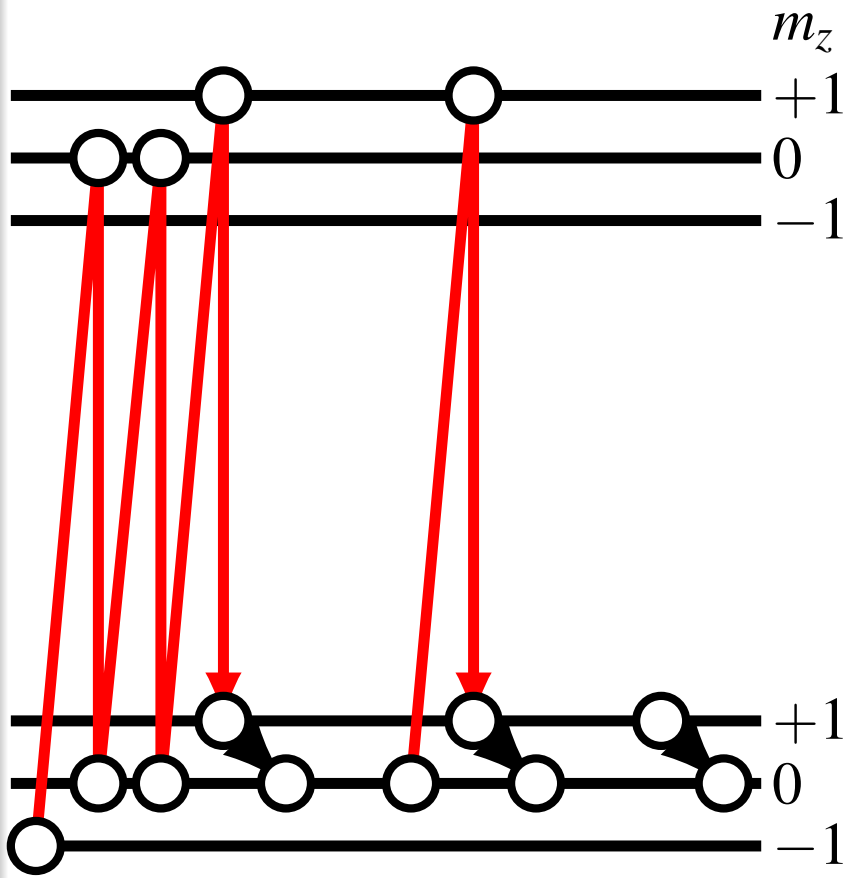

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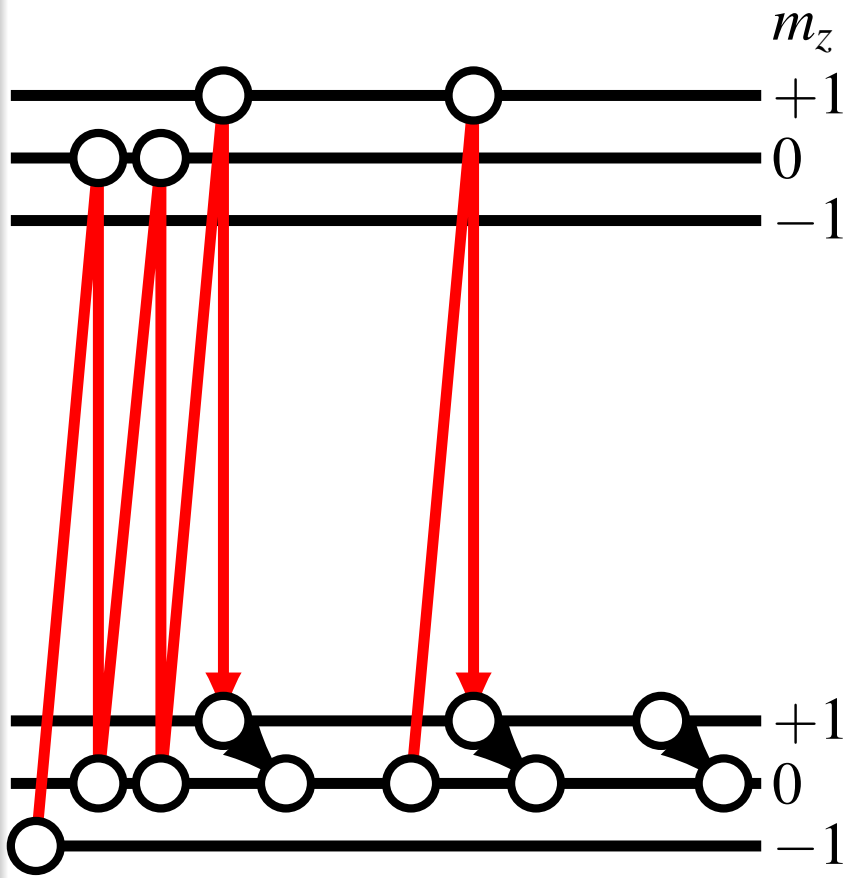

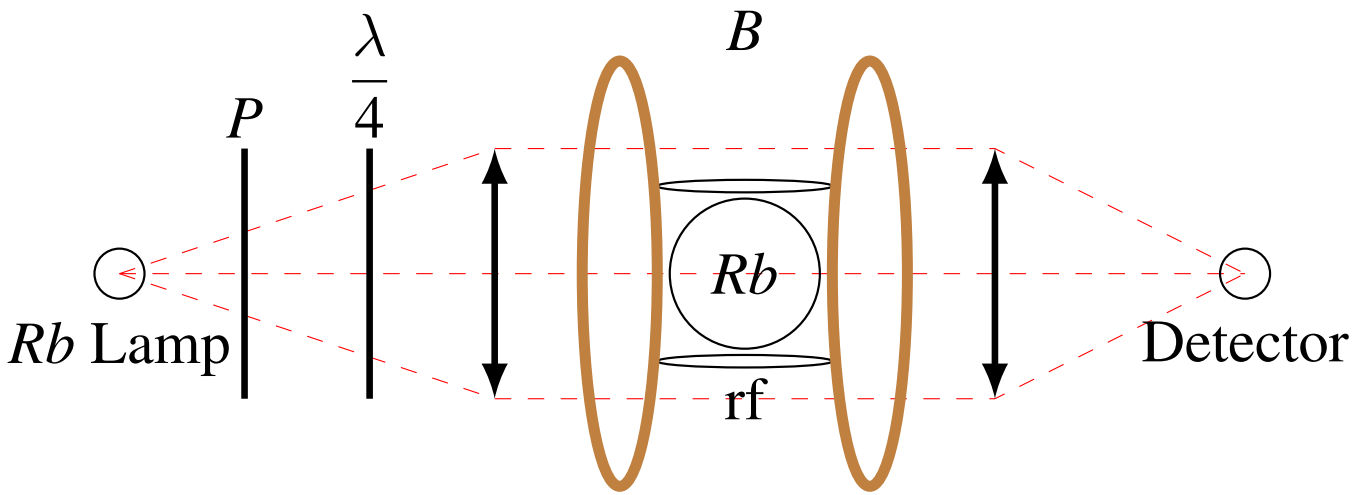


- Circular polarization.
- $^{85}Rb$ and $^{87}Rb$

# Conclusion.