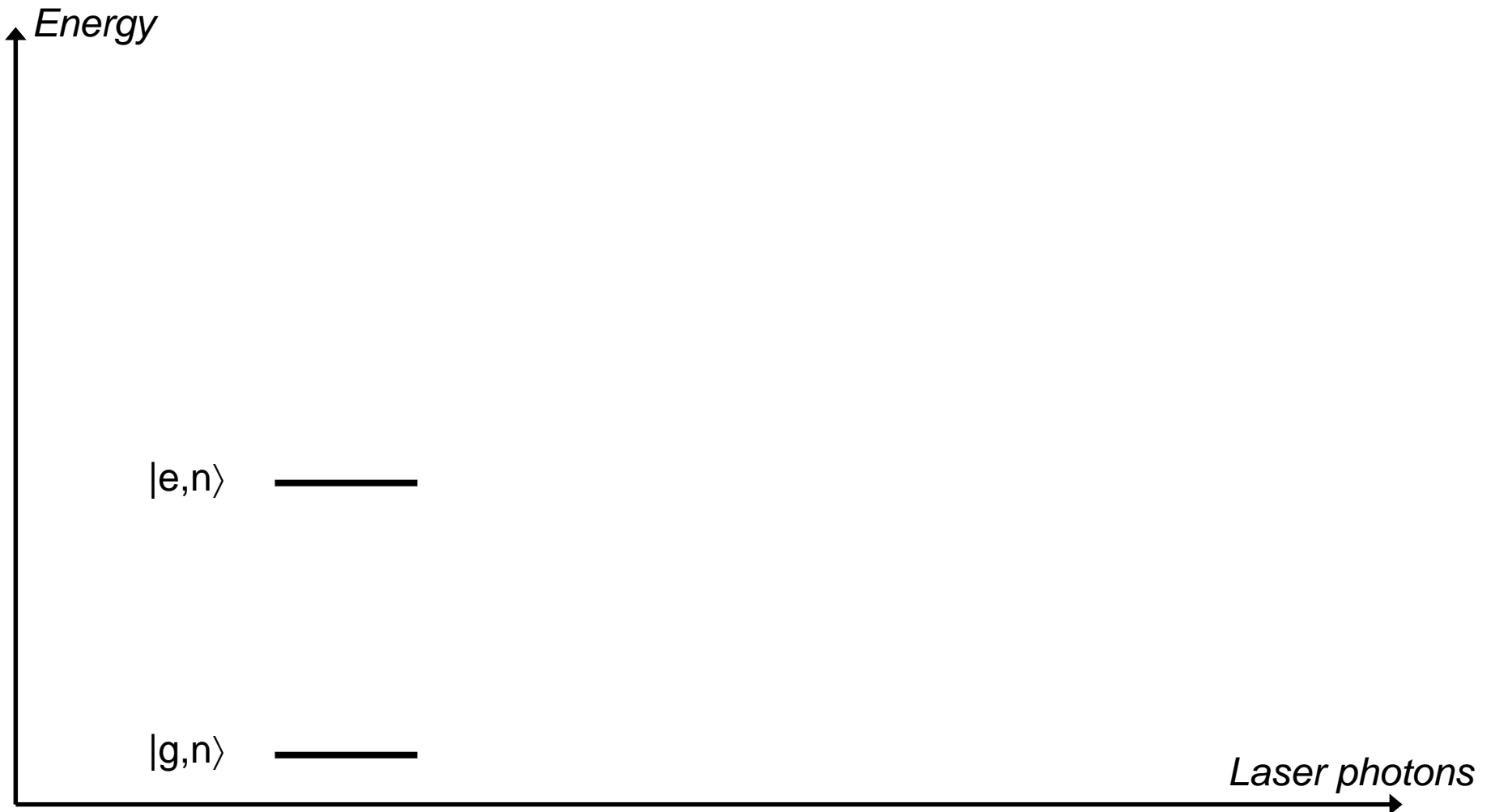


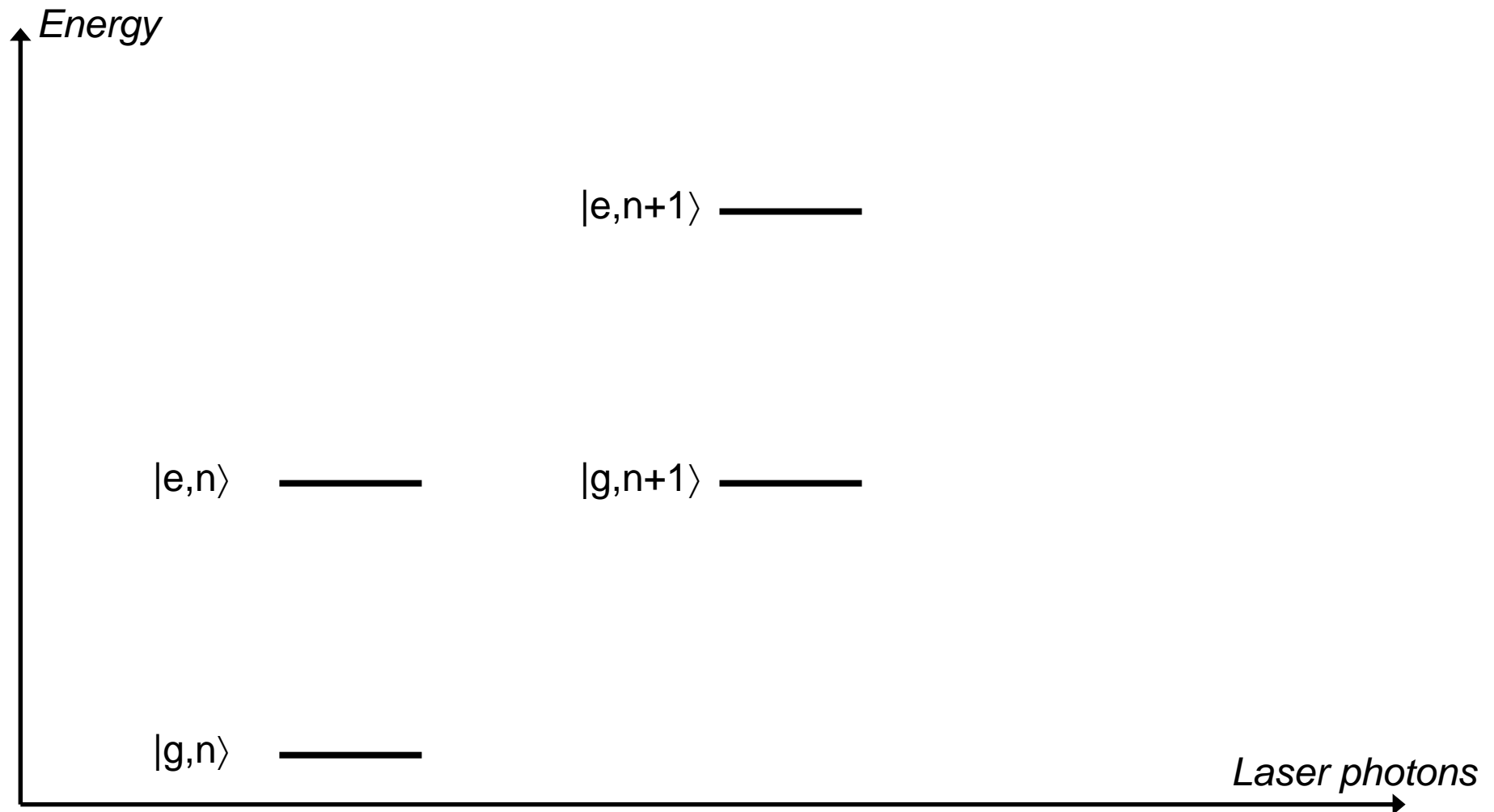
Mollow Triplet (I)

Atom + Laser Field (dressed atom picture), $\delta=0$



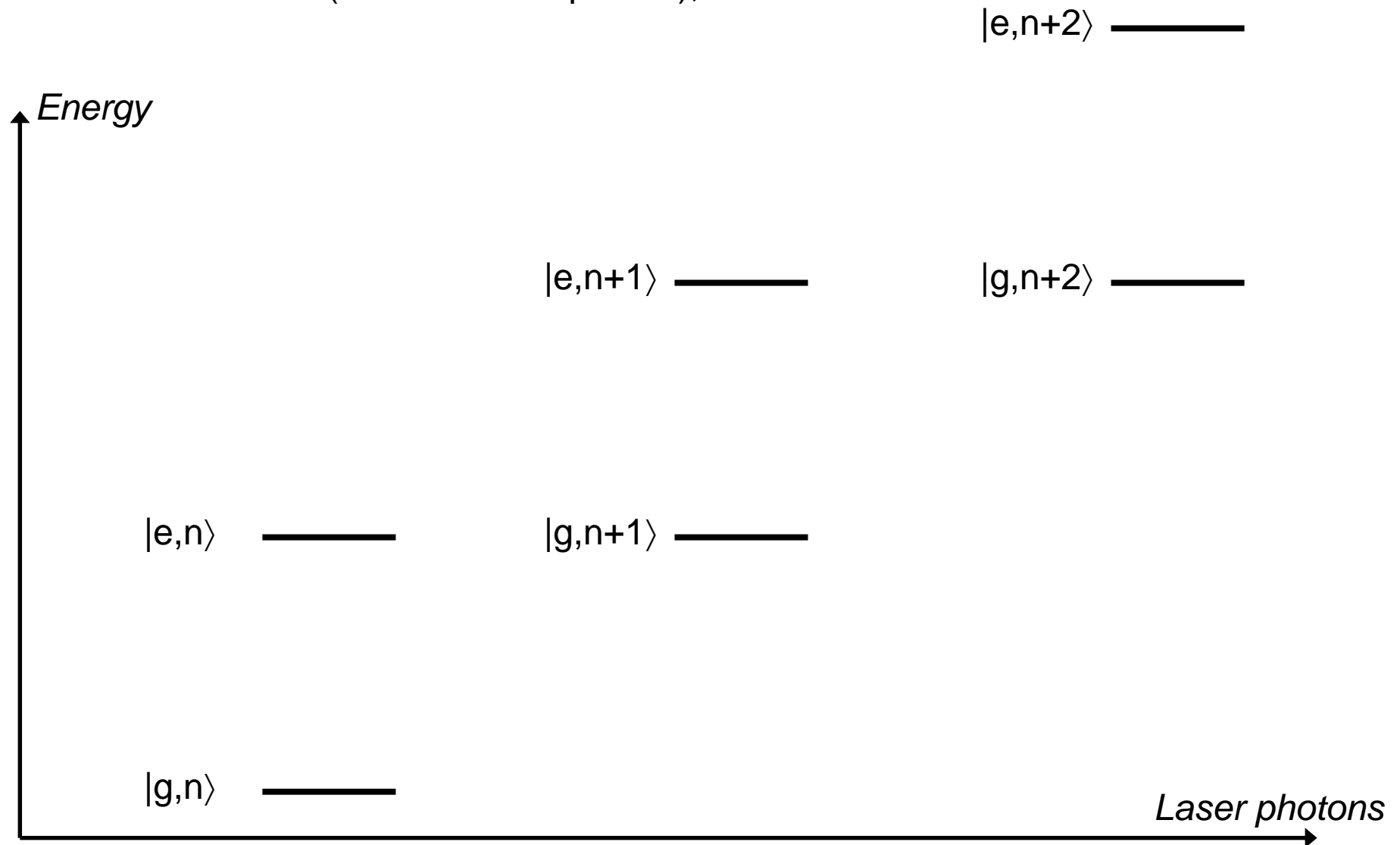
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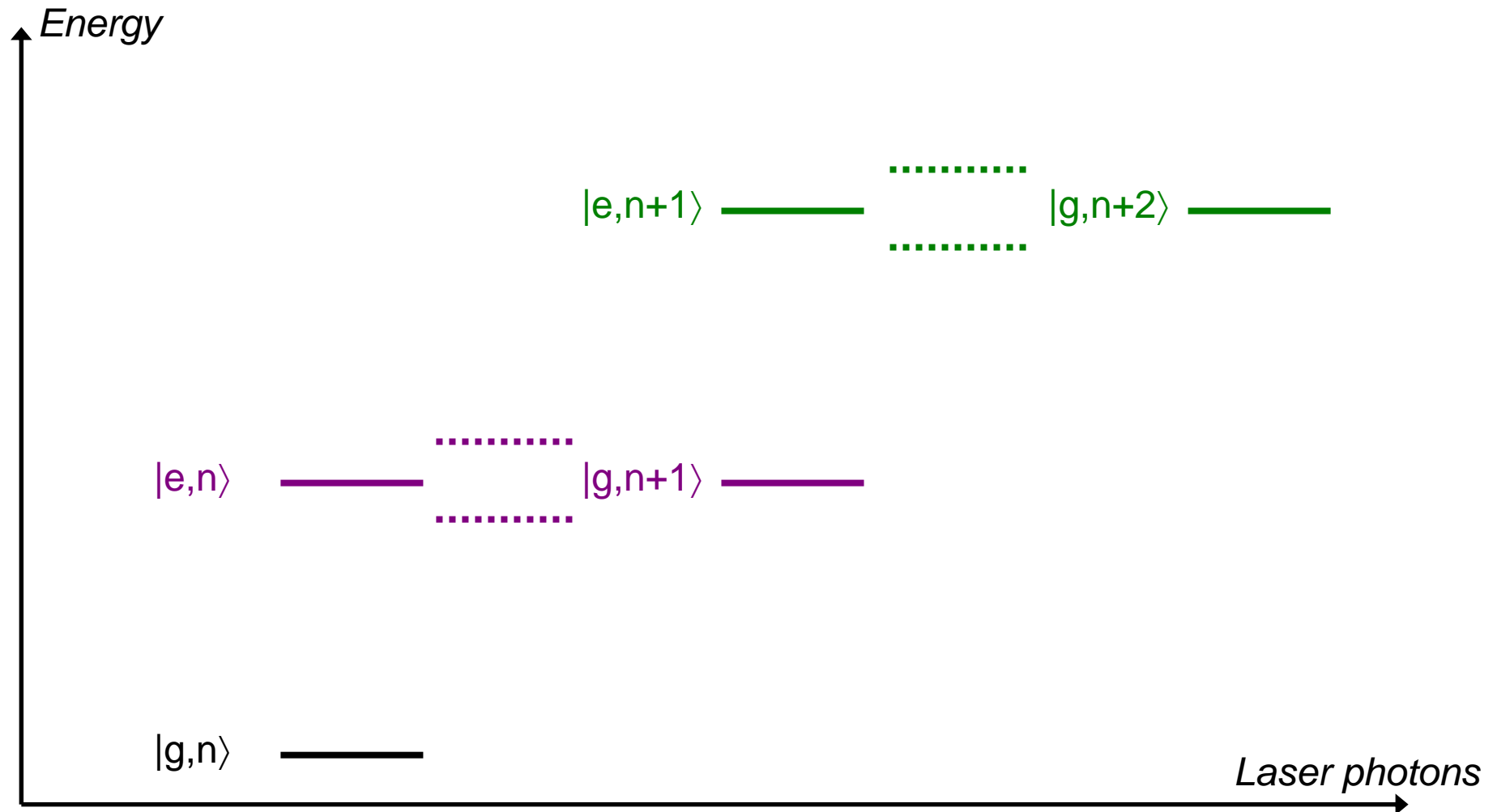
Atom + Laser Field (dressed atom picture), $\delta=0$



Mollow Triplet (II)

Atom + Laser Field (dressed atom picture), $\delta=0$

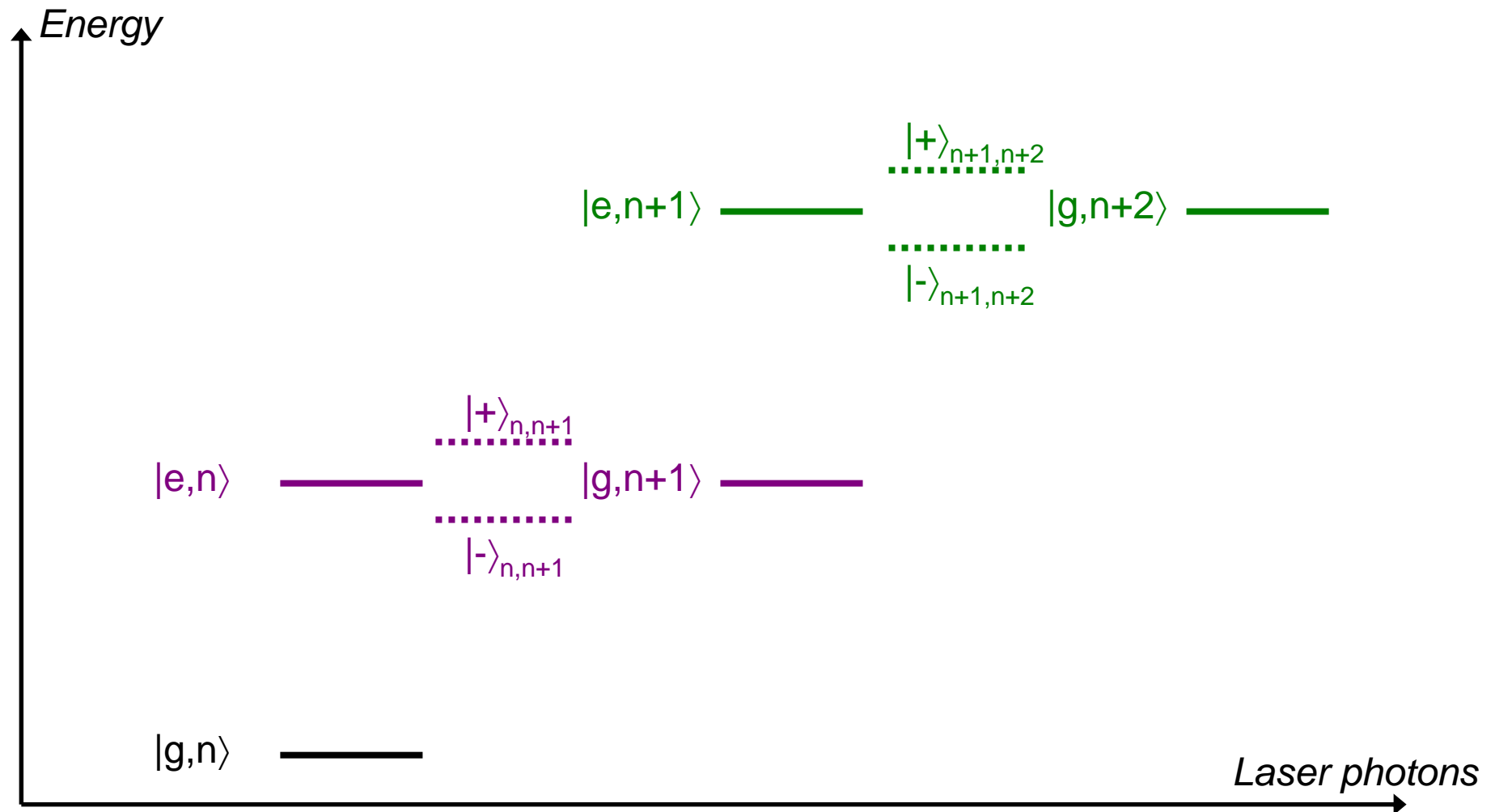
+ add-in atom-laser interaction energy



Mollow Triplet (II)

Atom + Laser Field (dressed atom picture), $\delta=0$

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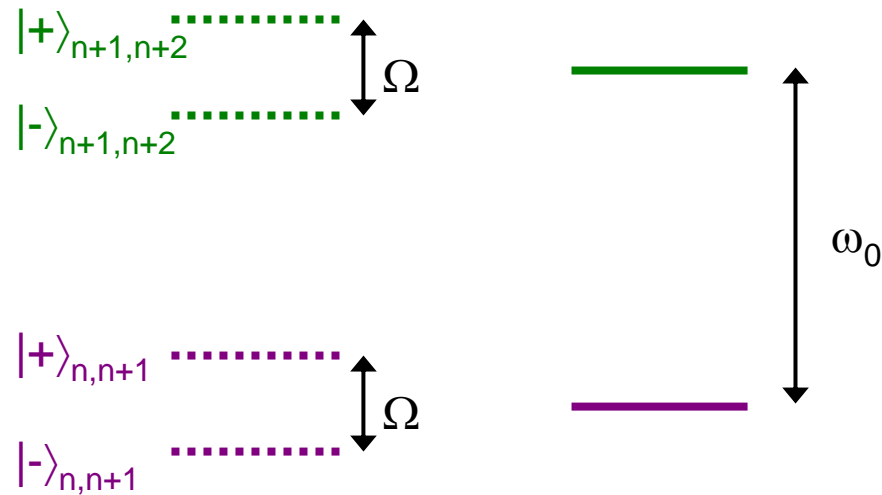


Mollow Triplet (II)

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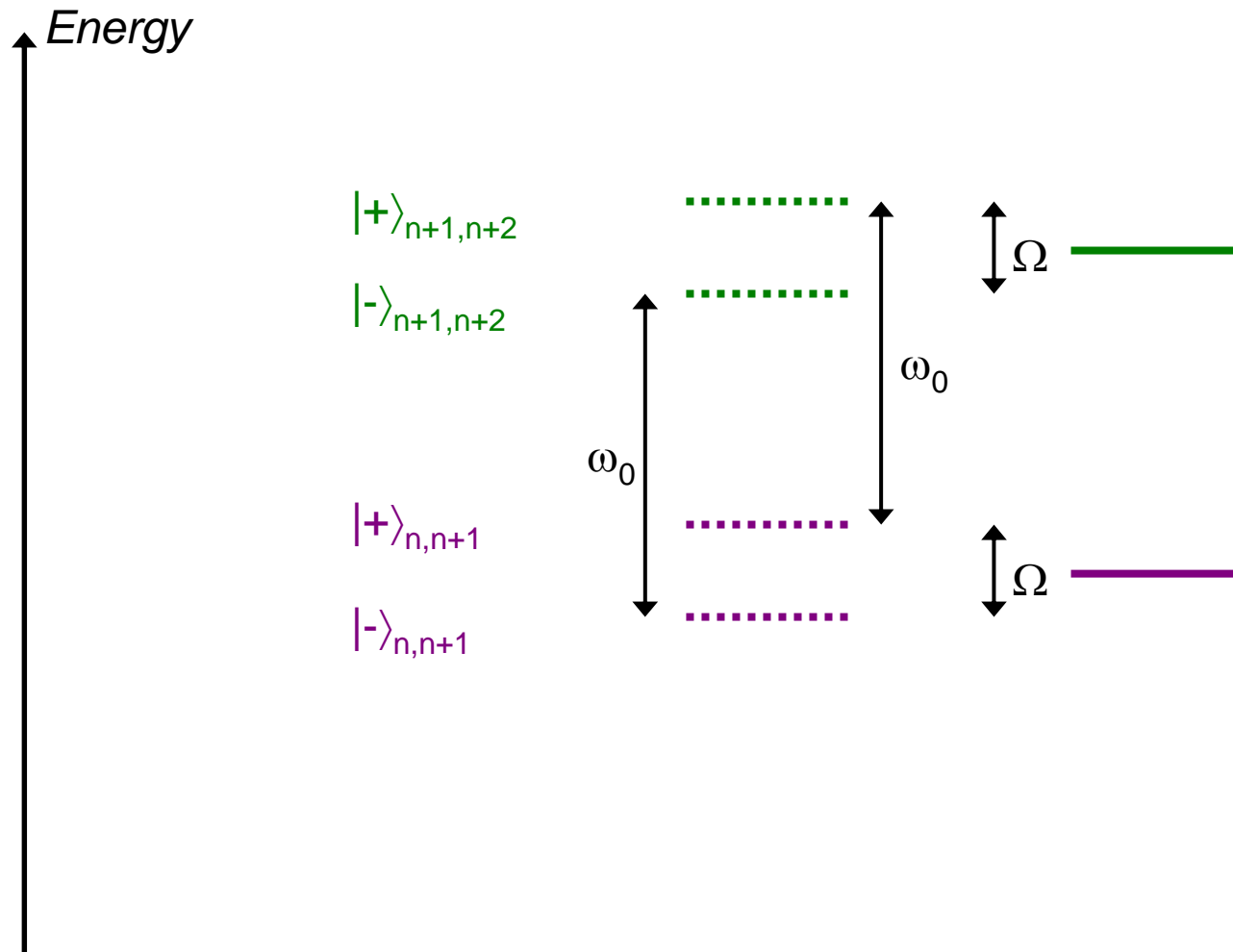
Energy



Mollow Triplet (II)

Atom + Laser Field (dressed atom picture), $\delta=0$

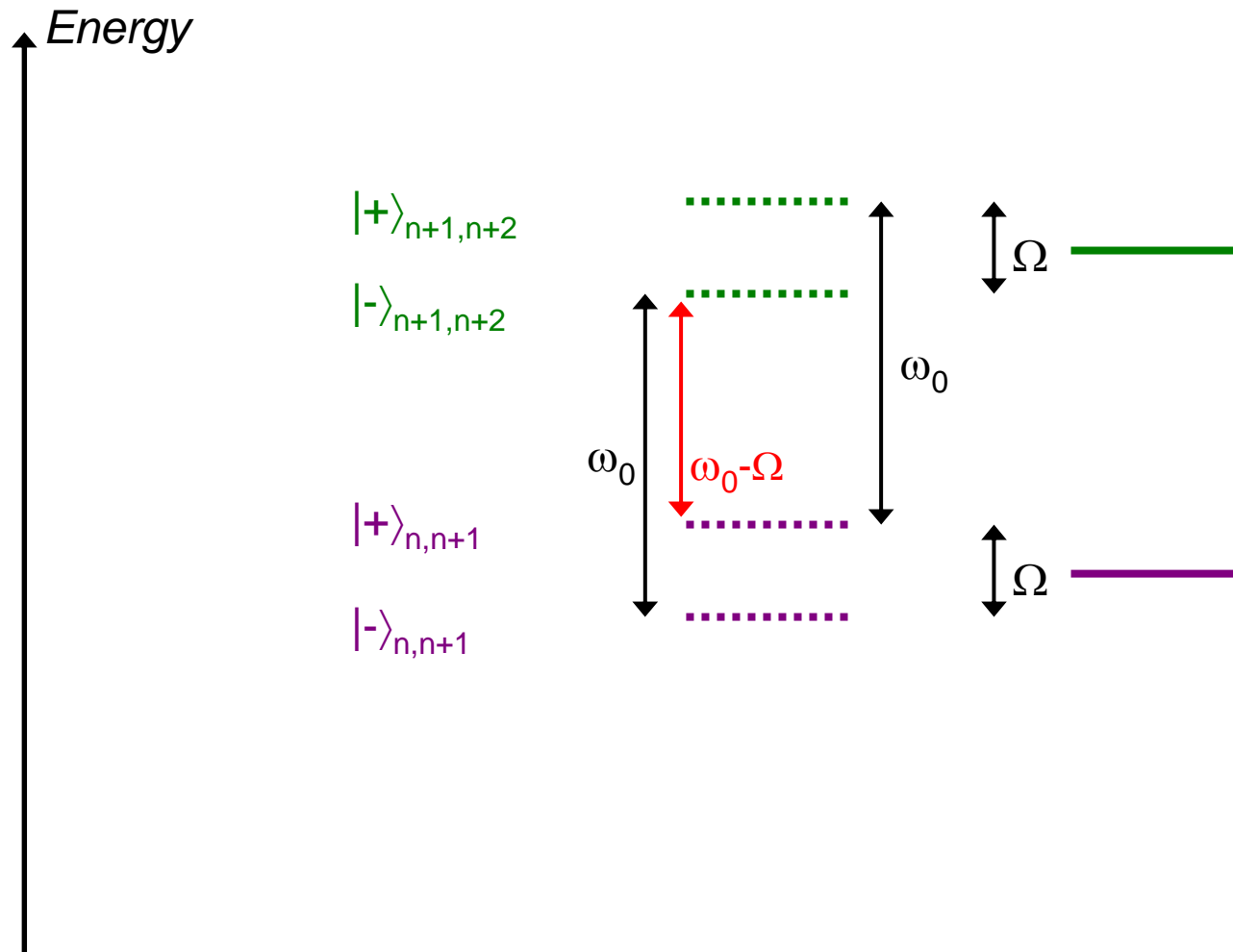
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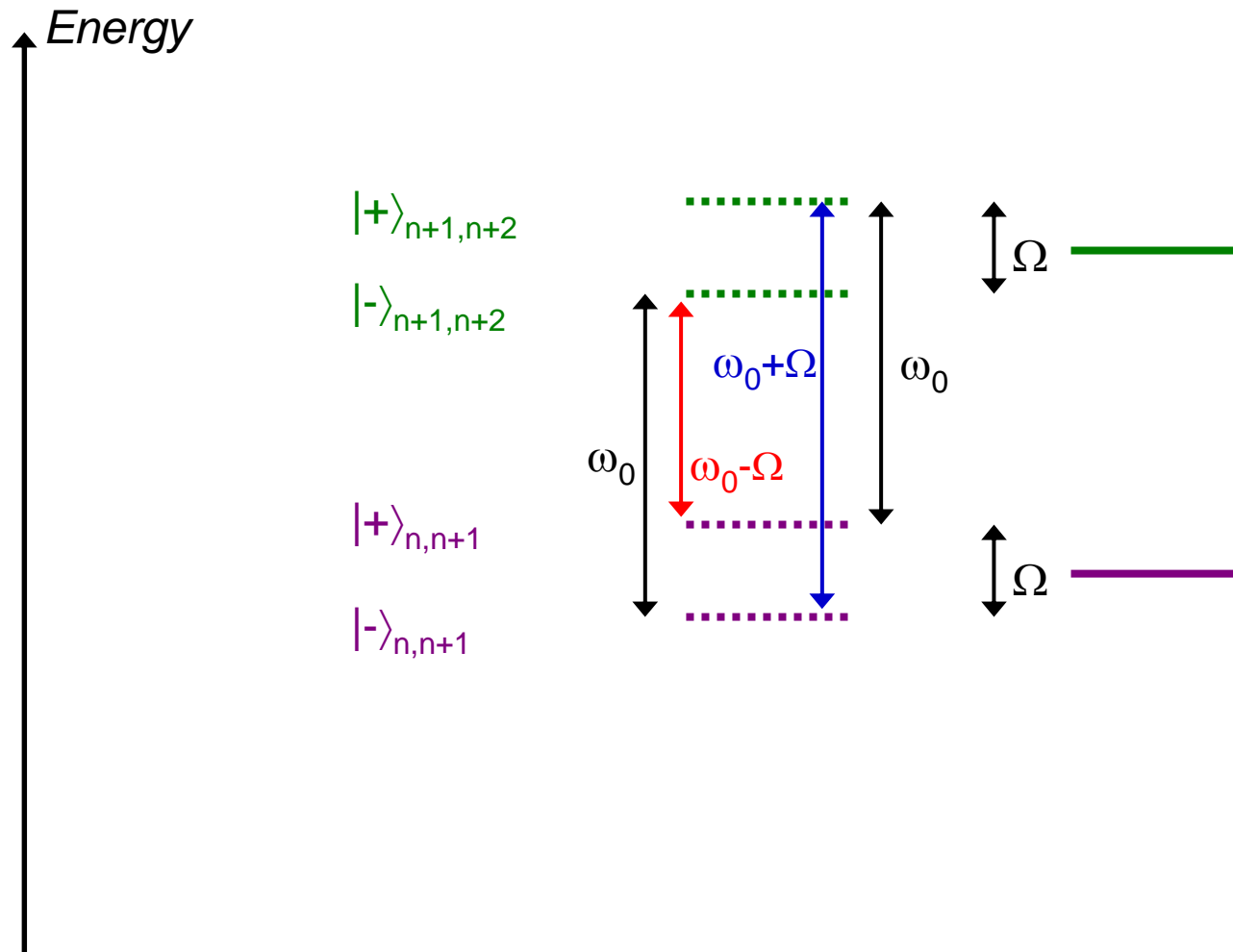
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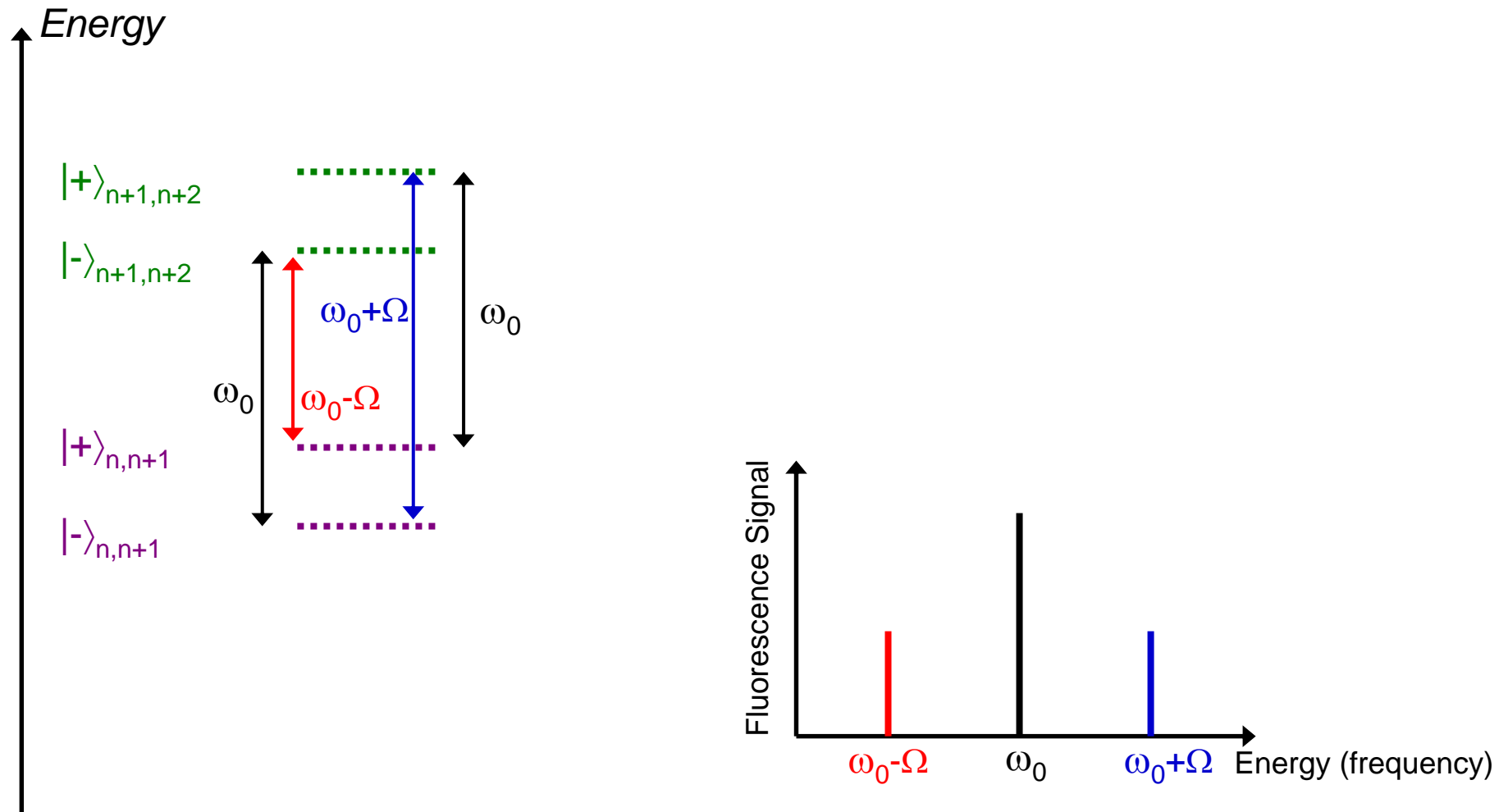
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Mollow Triplet (III)

Atom + Laser Field (dressed atom picture), $\delta=0$

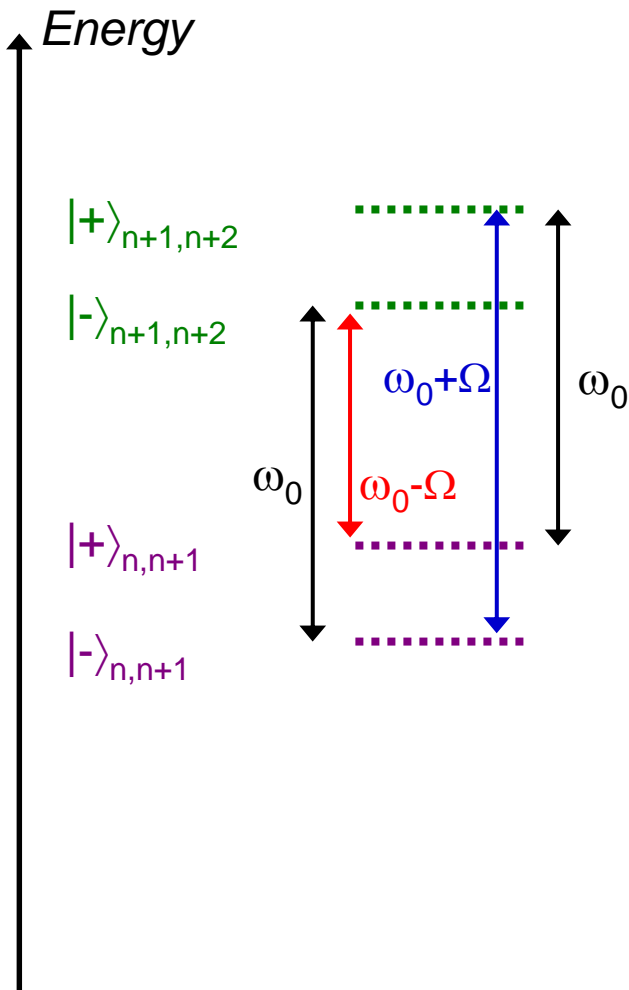
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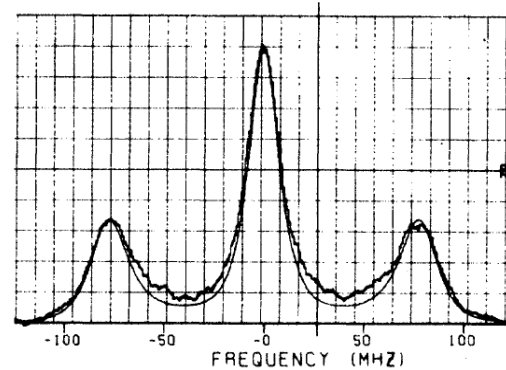
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Atom + Laser Field (dressed atom picture), $\delta=0$

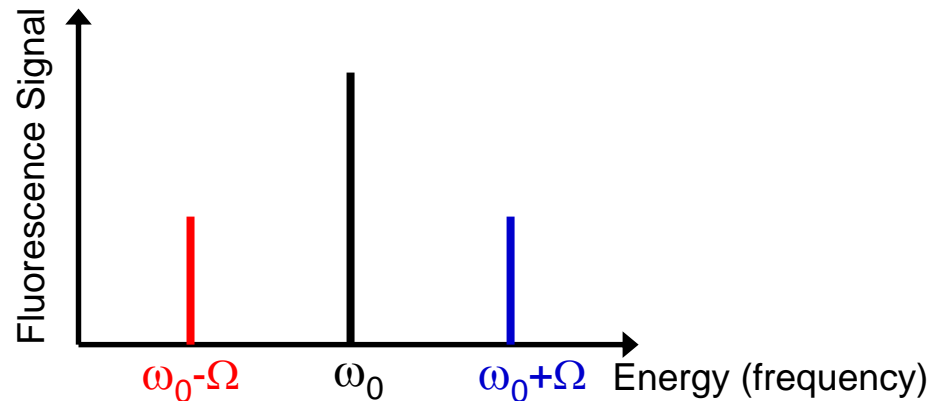
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Mollow triplet in Sodium at 589 nm



[Grove et al., Phys. Rev. A 15, 227 (1977)]



Laser Dipole traps

Example of AC Stark Shift:

- 10 mW of laser power.
- focused to down to 10 μm .
- Detuning: $\delta = -2\pi \times 100 \text{ GHz}$.

Recall

$$\Delta E = \frac{\hbar \Omega^2}{4 \delta} \quad \text{with} \quad \Omega = \frac{q_e \langle g | r | e \rangle \cdot E}{\hbar}$$

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~ 10 mK !!!

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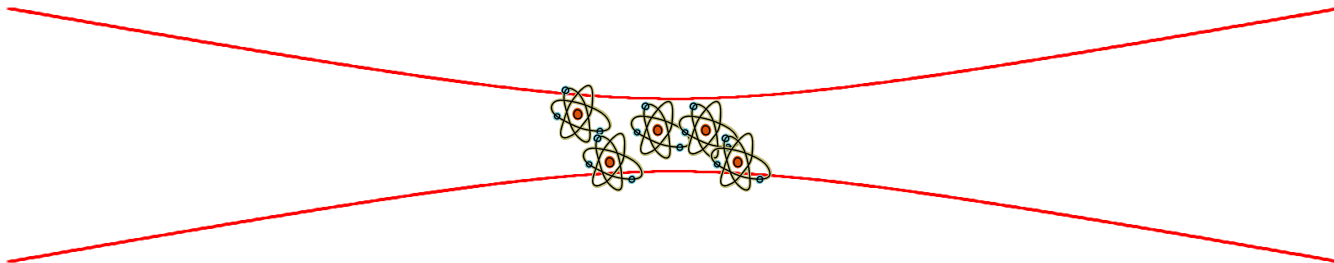
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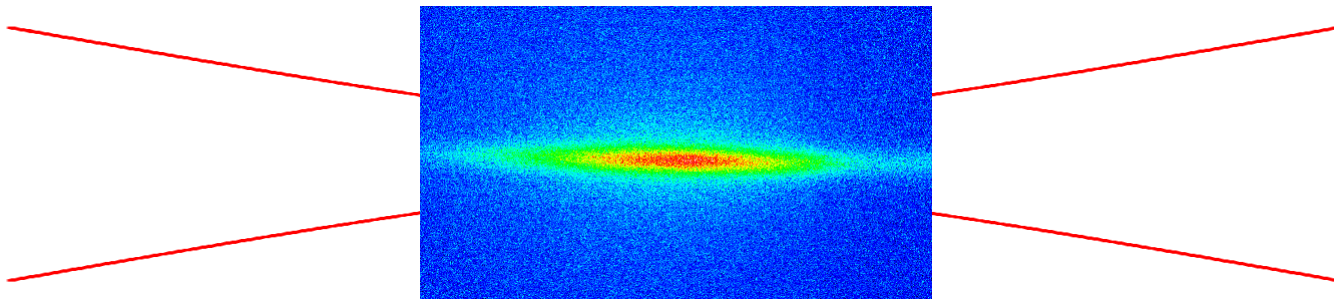


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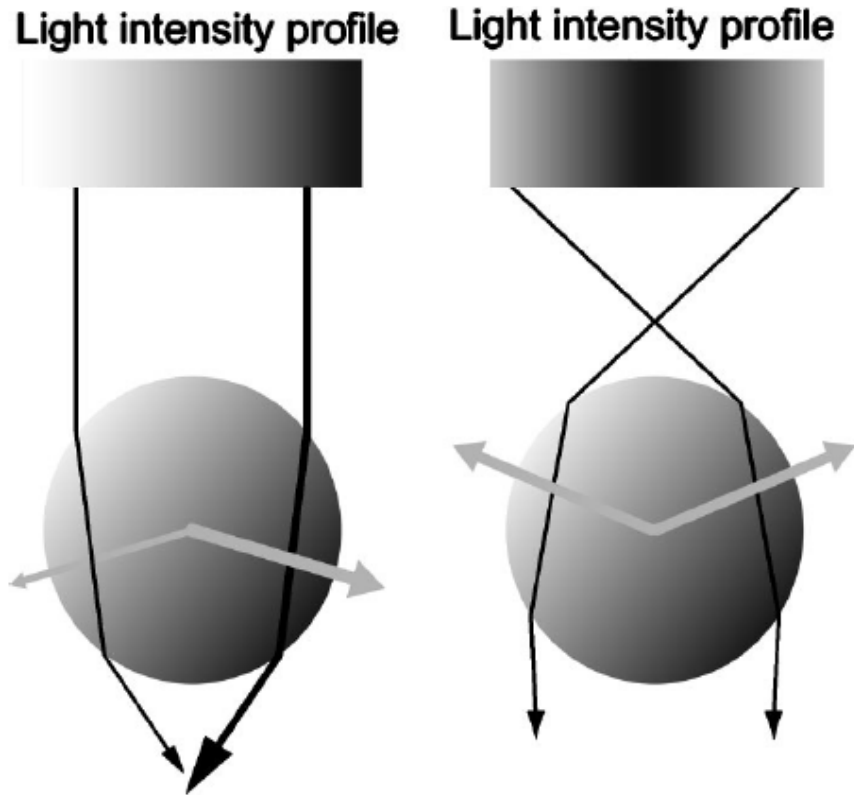
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Atoms are trapped by focused laser light !!!



Optical Tweezers

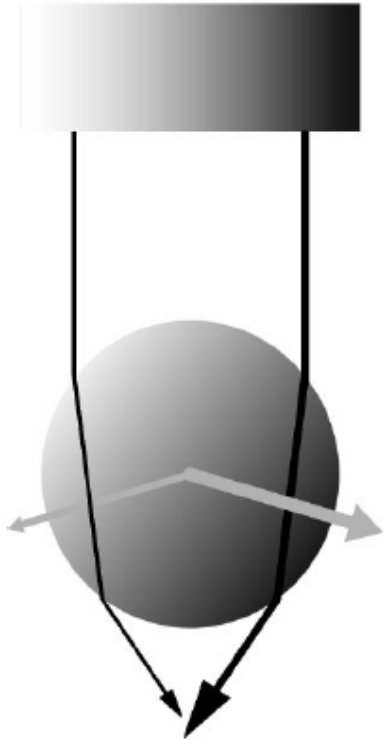
The classical picture of dipole trapping is given by ray optics:



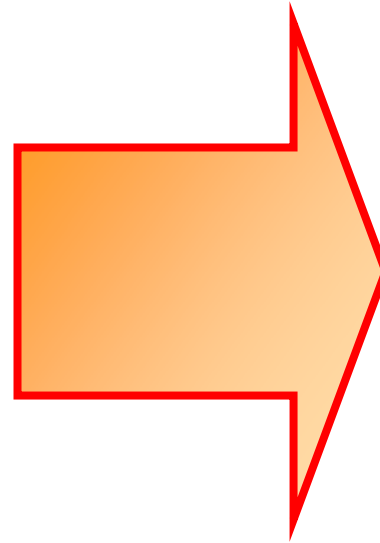
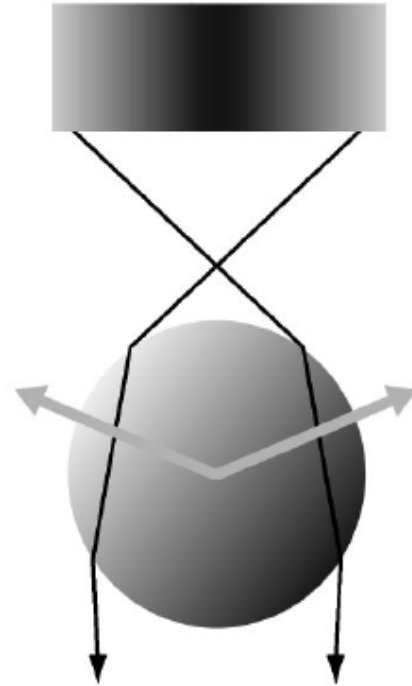
Optical Tweezers

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Light intensity profile



Light intensity profile



Frequently used in
biophysics to
manipulate cells !!!