

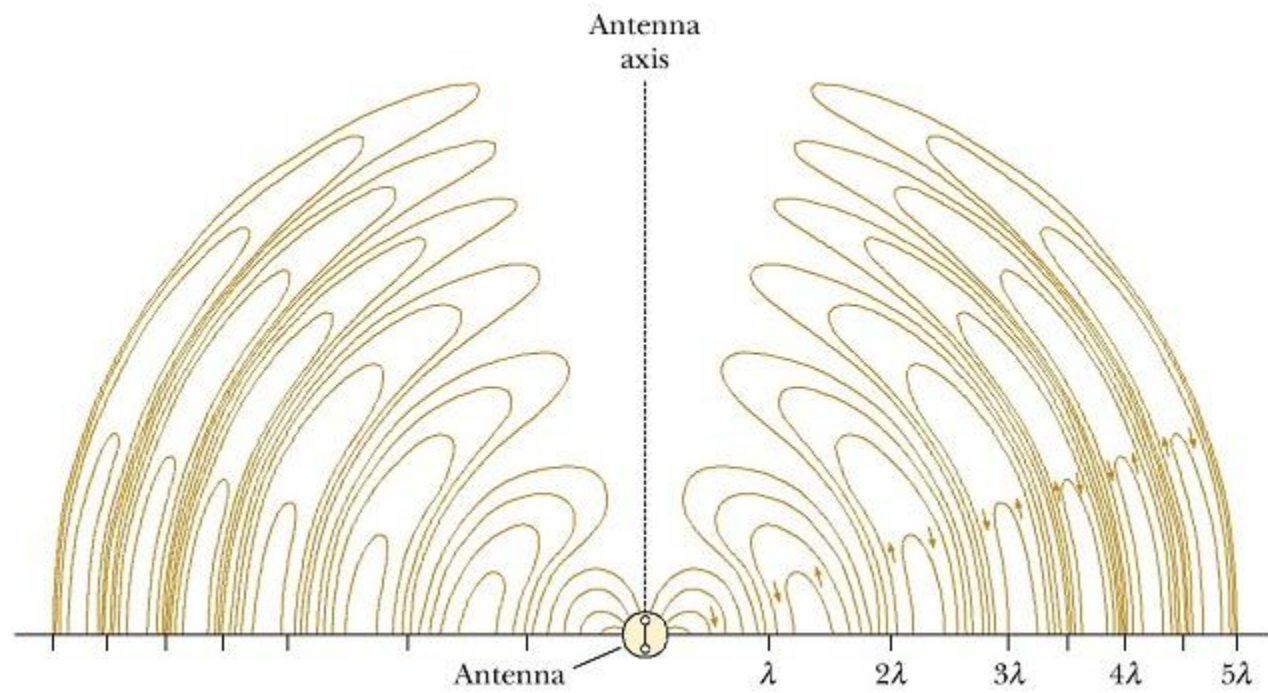


# Atom v magnetnem polju in prehodi v kvantnih sistemih

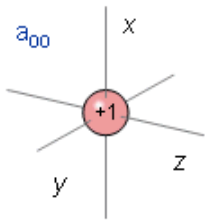
Tomaž Urbič

FKKT, Univerza v Ljubljani

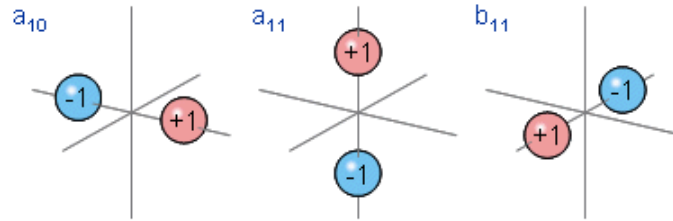
[www.fkkt.uni-lj.si](http://www.fkkt.uni-lj.si)



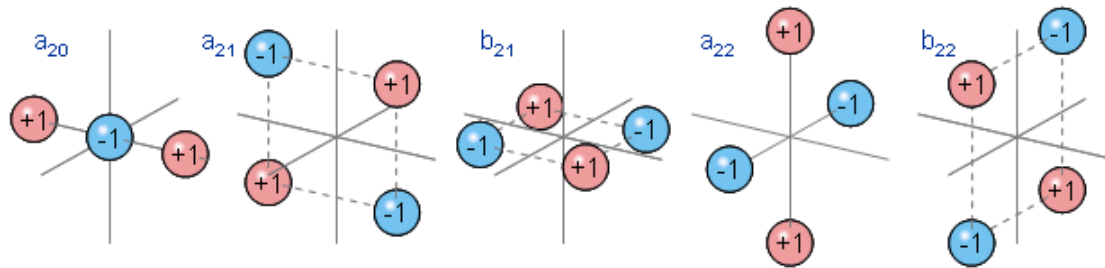
# MONOPOLE



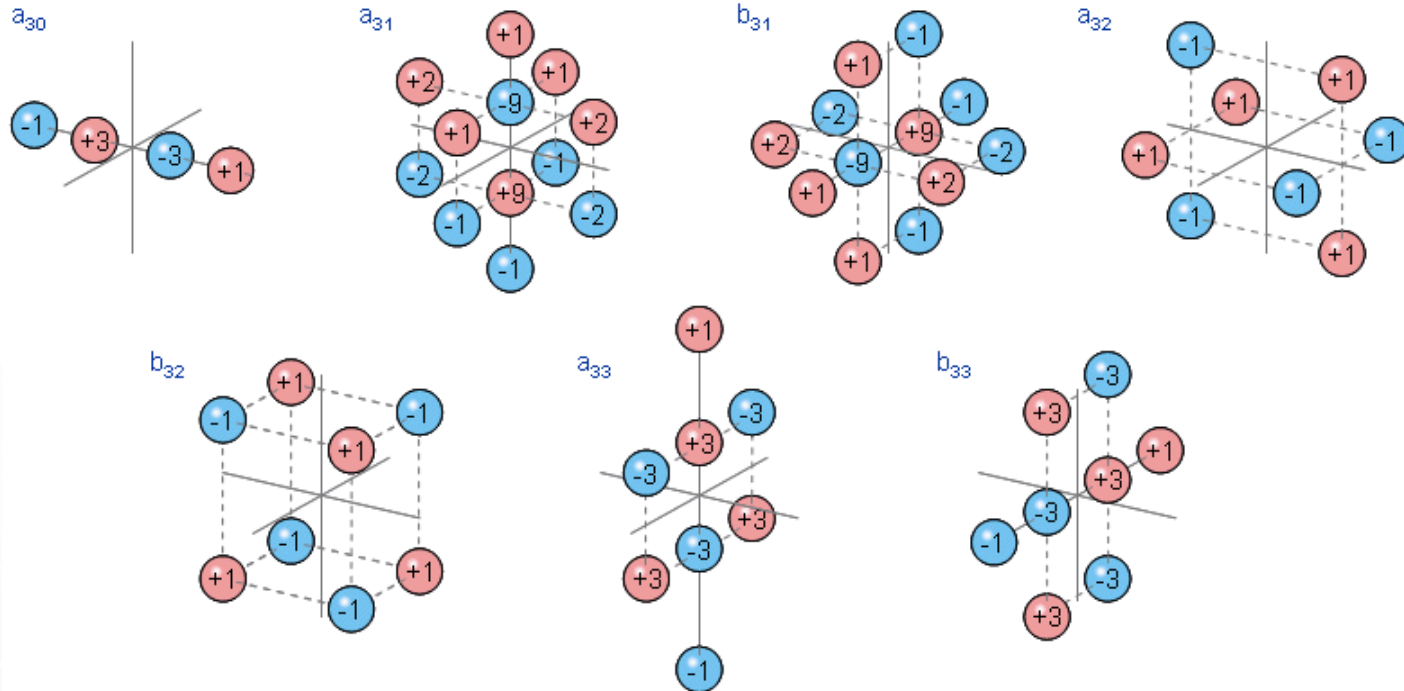
# DIPOLE

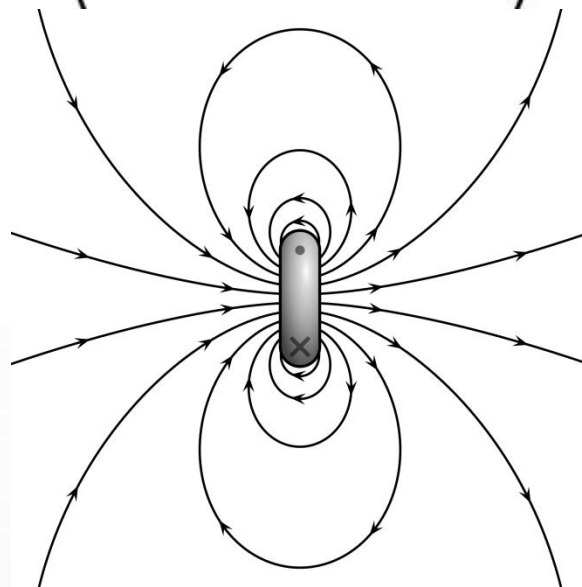
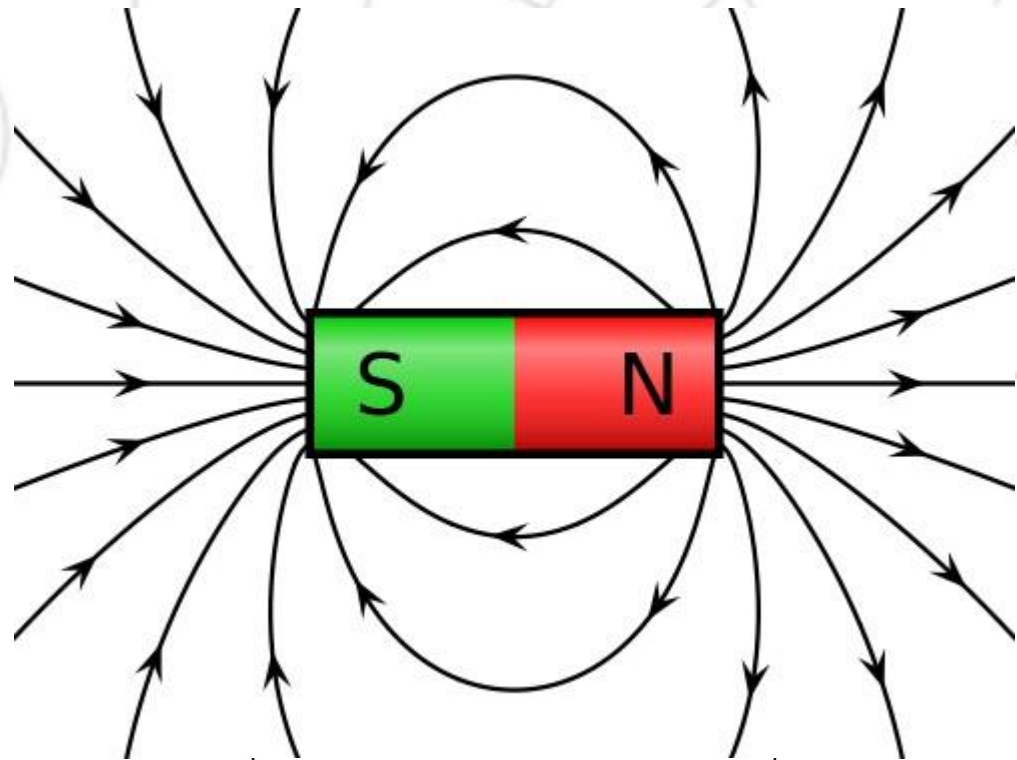
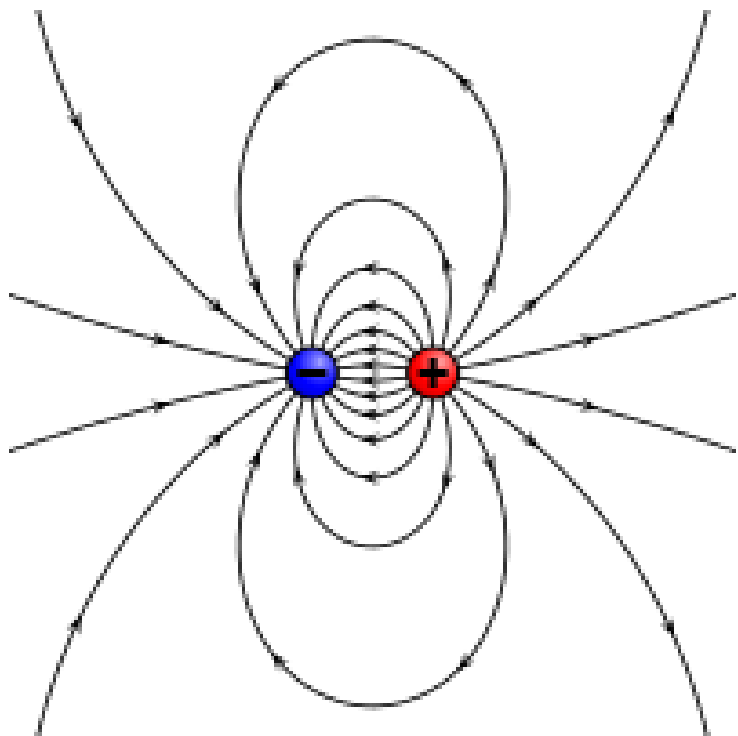


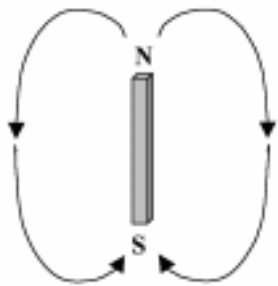
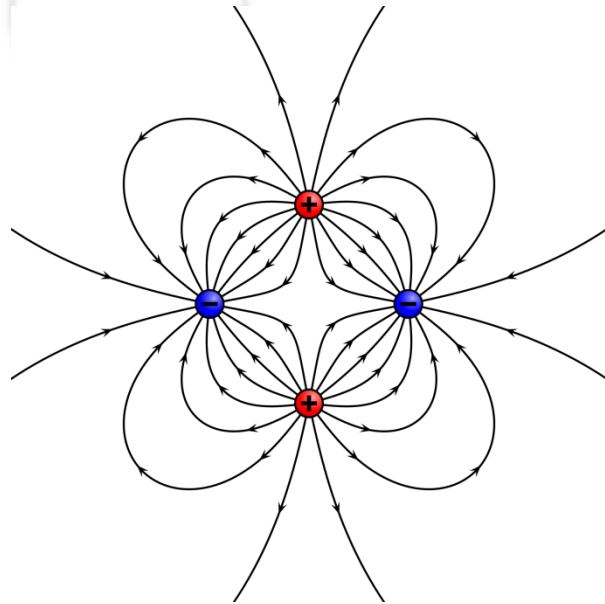
# QUADRUPOLE



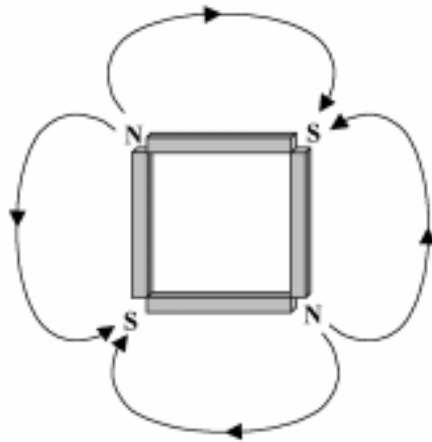
# OCTAPOLE



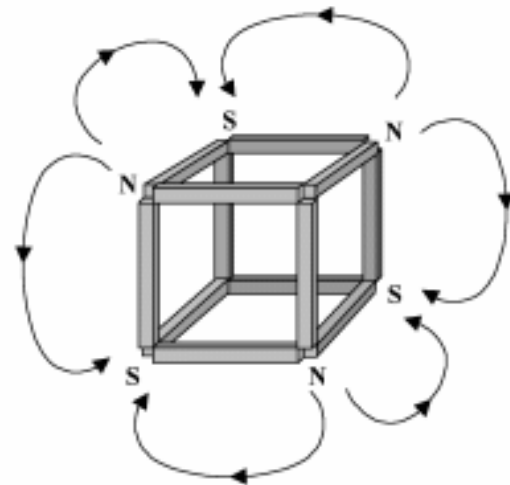




(a) Dipole

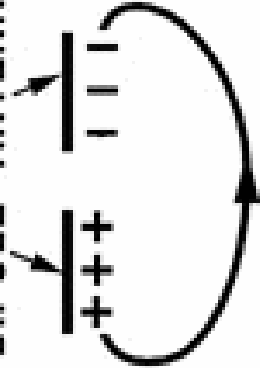


(b) Quadrupole

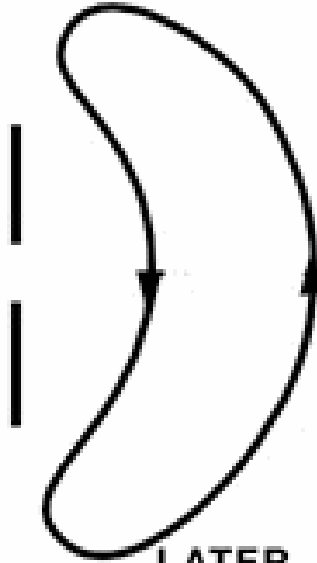


(c) Octopole

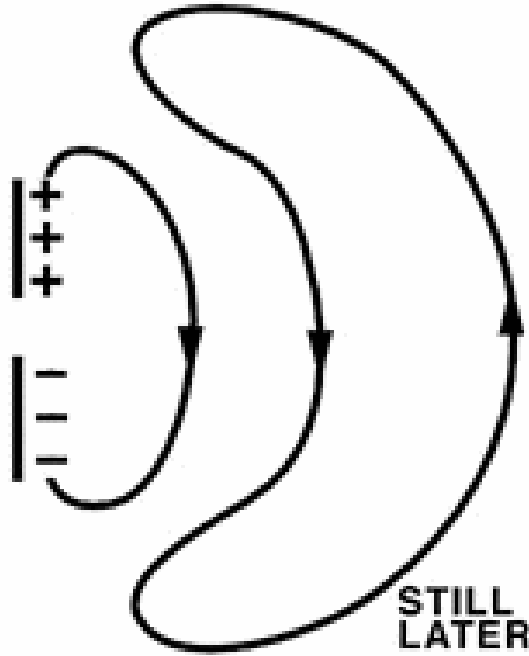
2 HALVES OF A  
"DIPOLE" ANTENNA



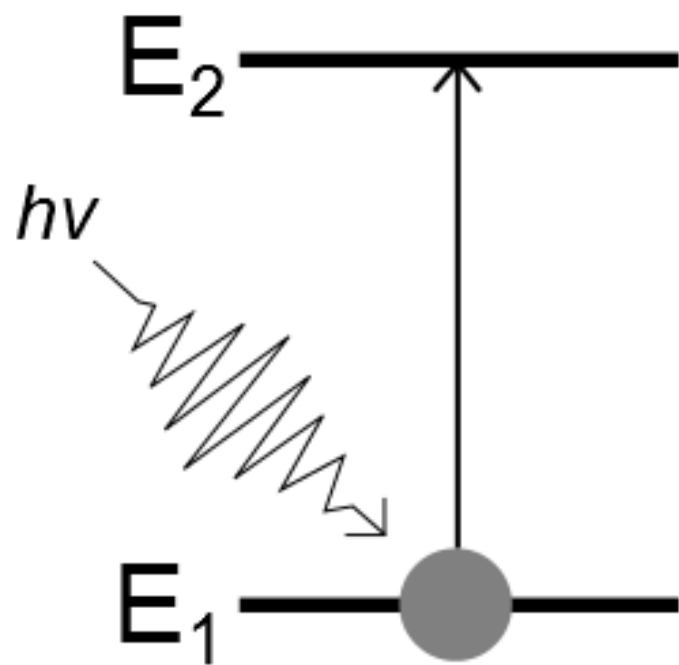
BEGINING



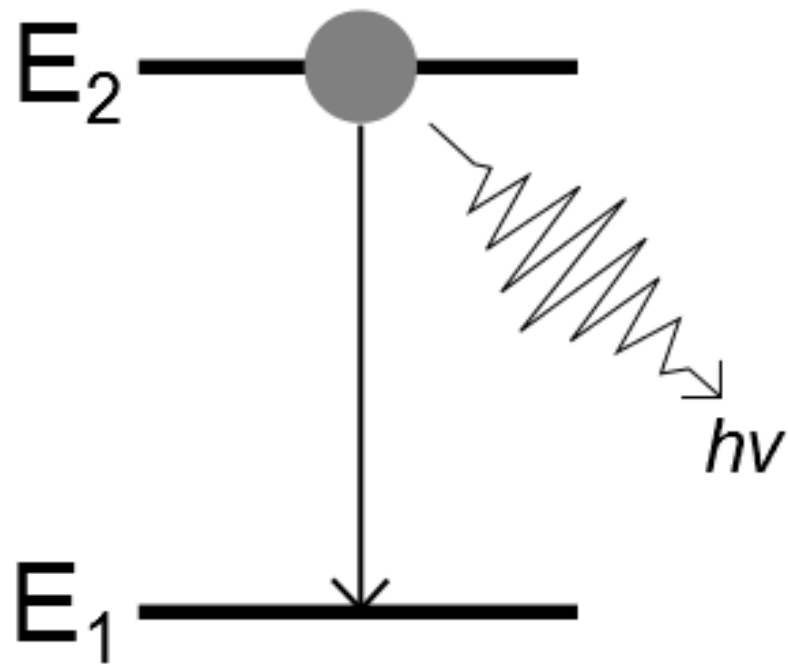
LATER



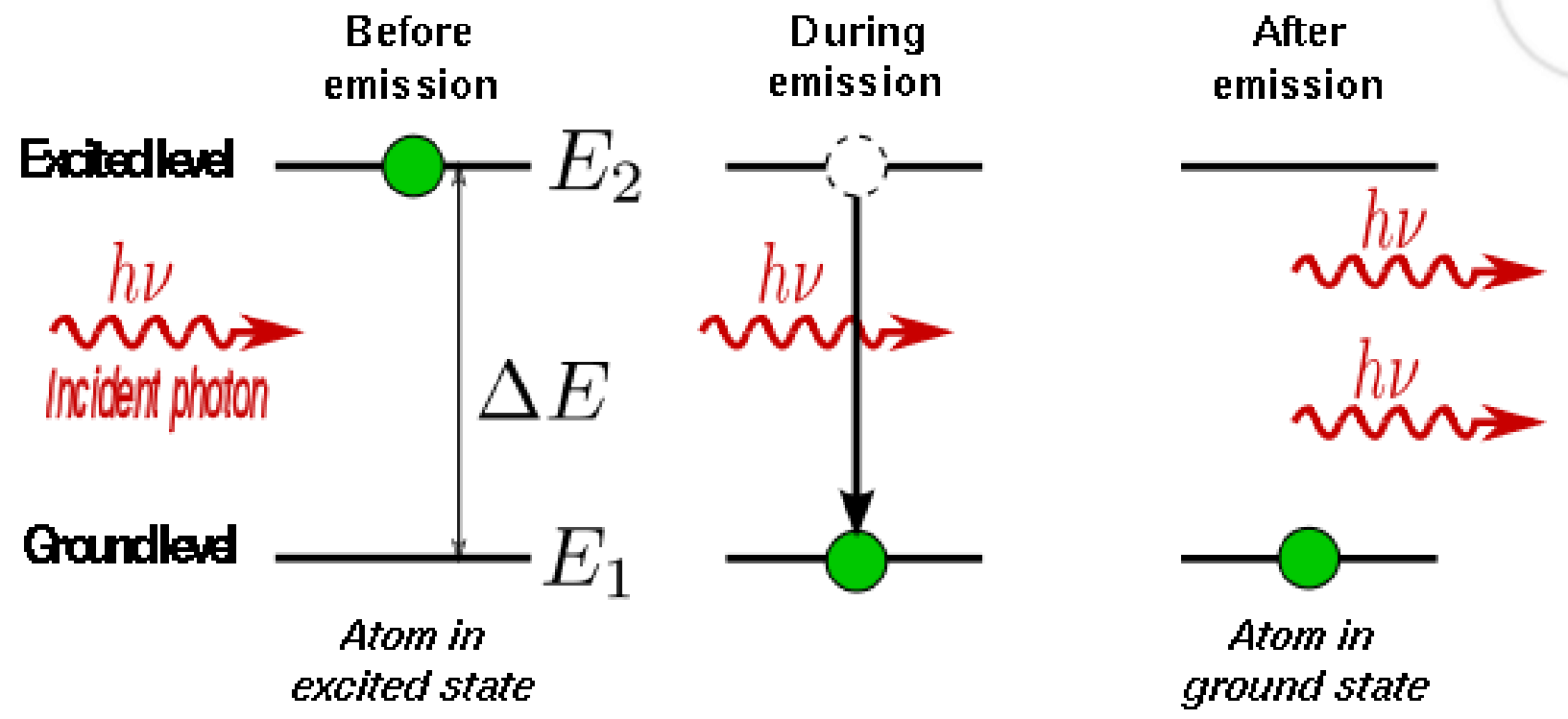
STILL  
LATER



ABSORPTION  
SPECTROSCOPY

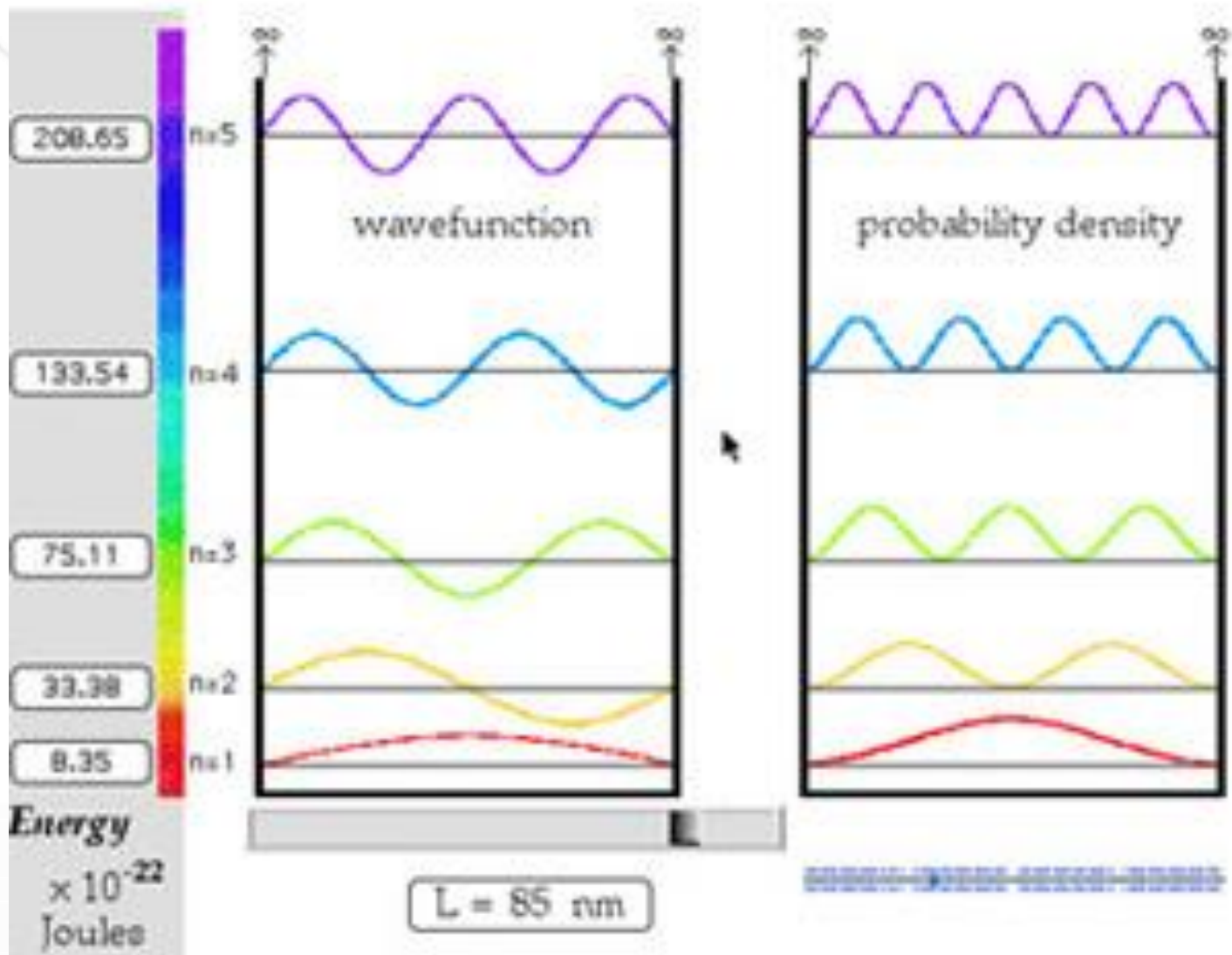


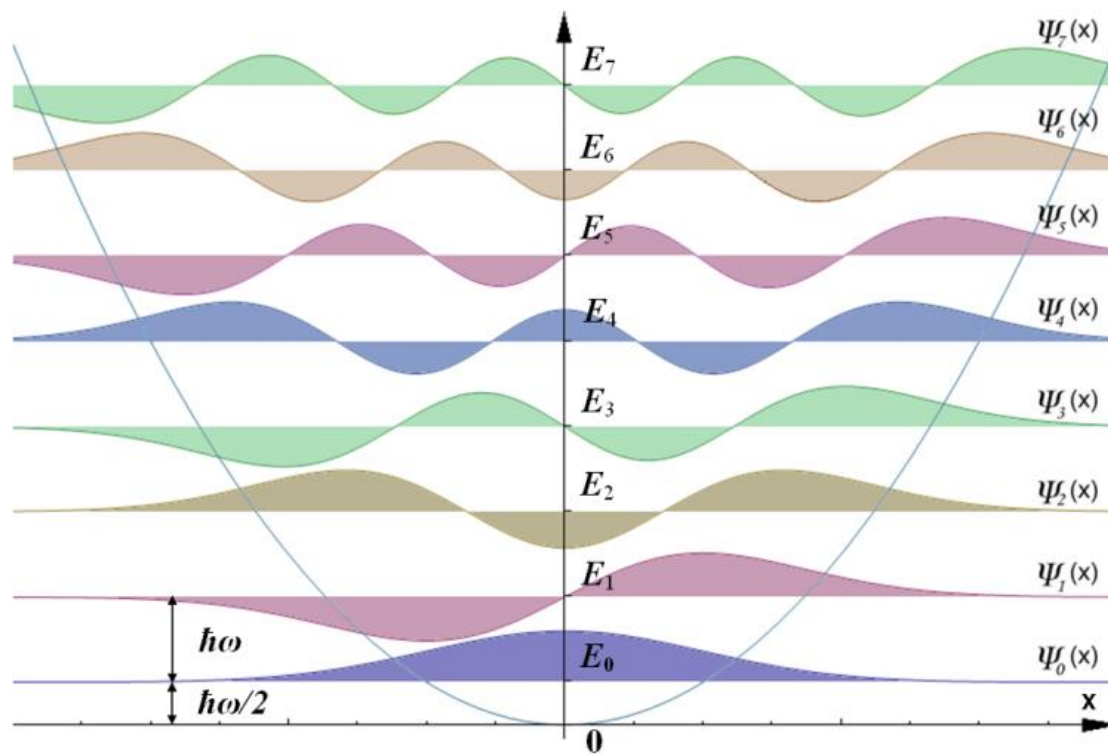
EMISSION  
SPECTROSCOPY

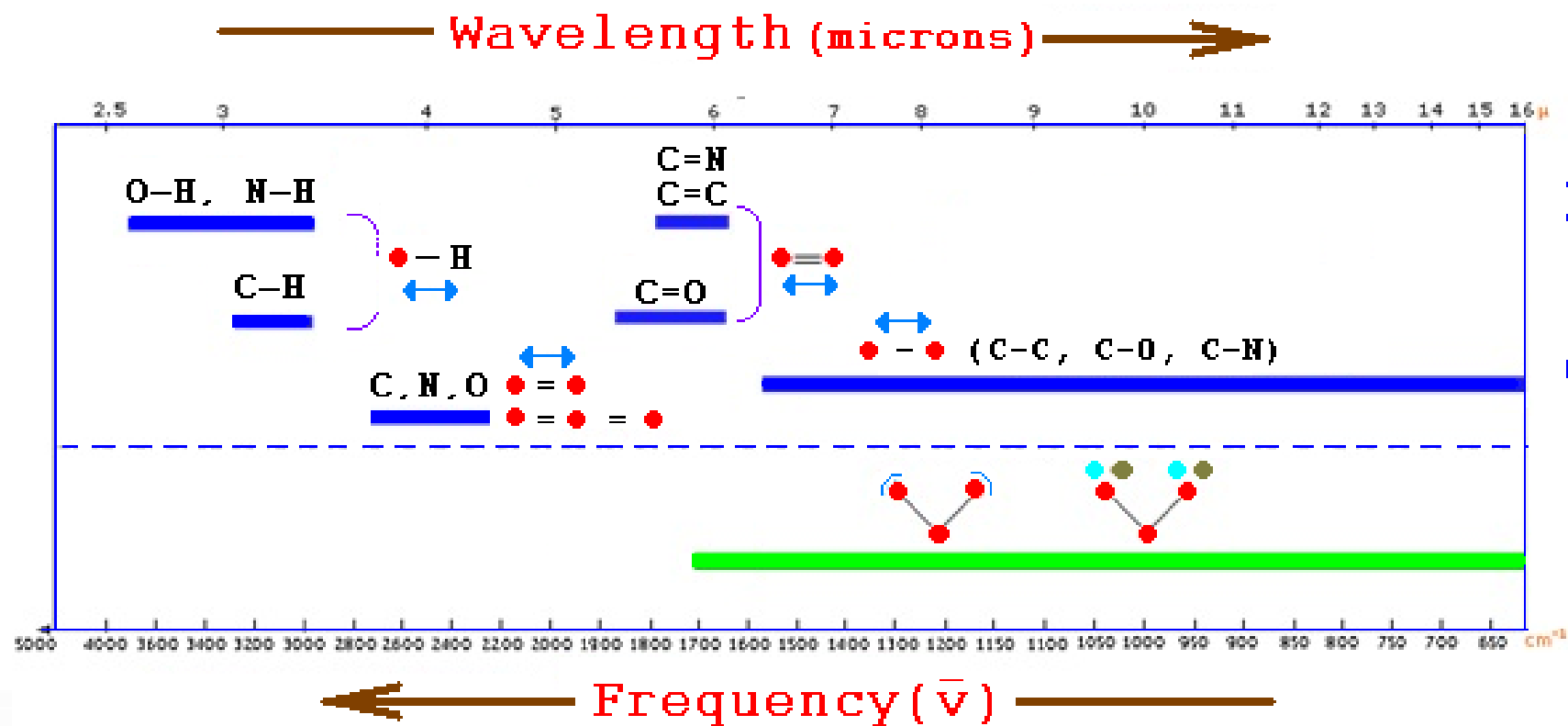


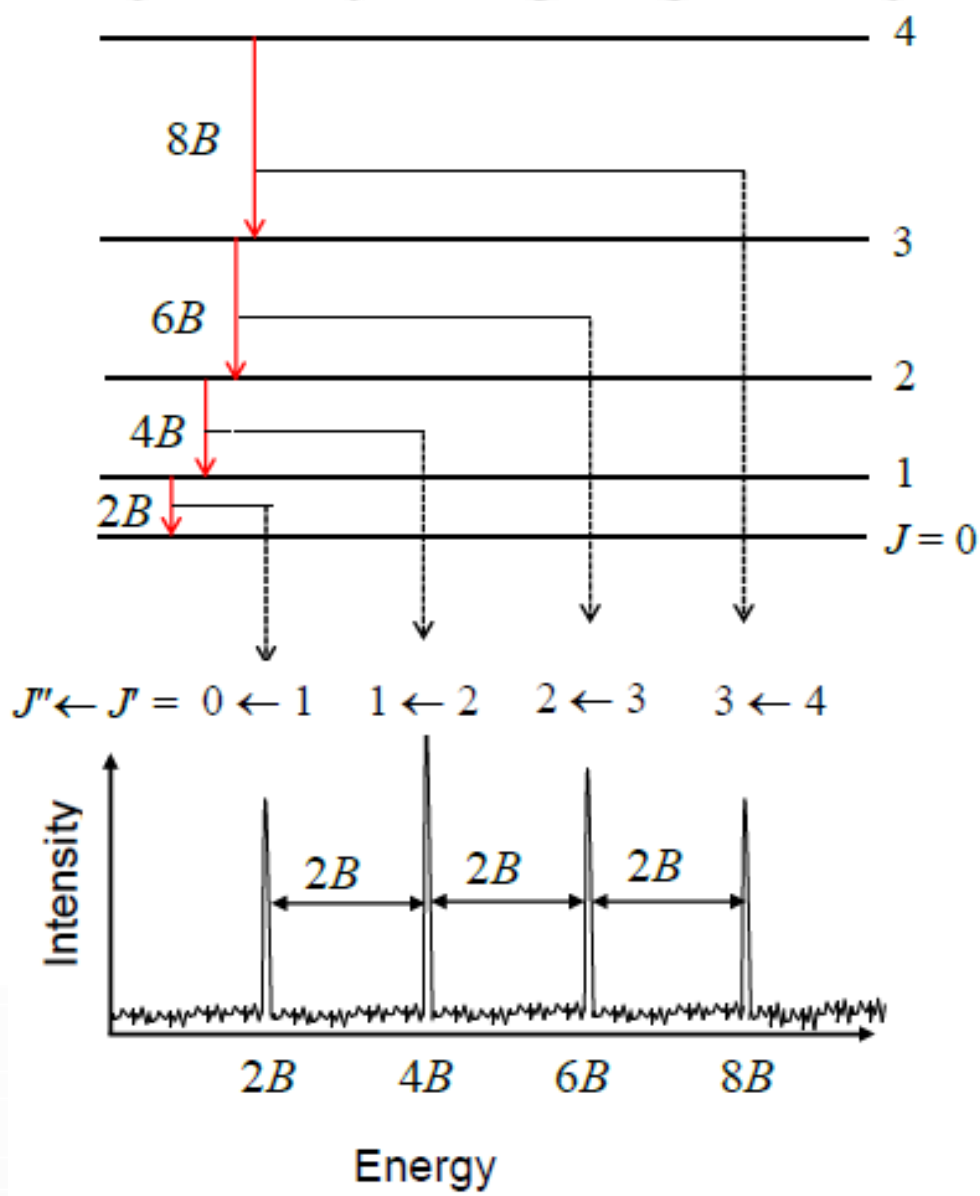
$$E_2 - E_1 = \Delta E = h\nu$$

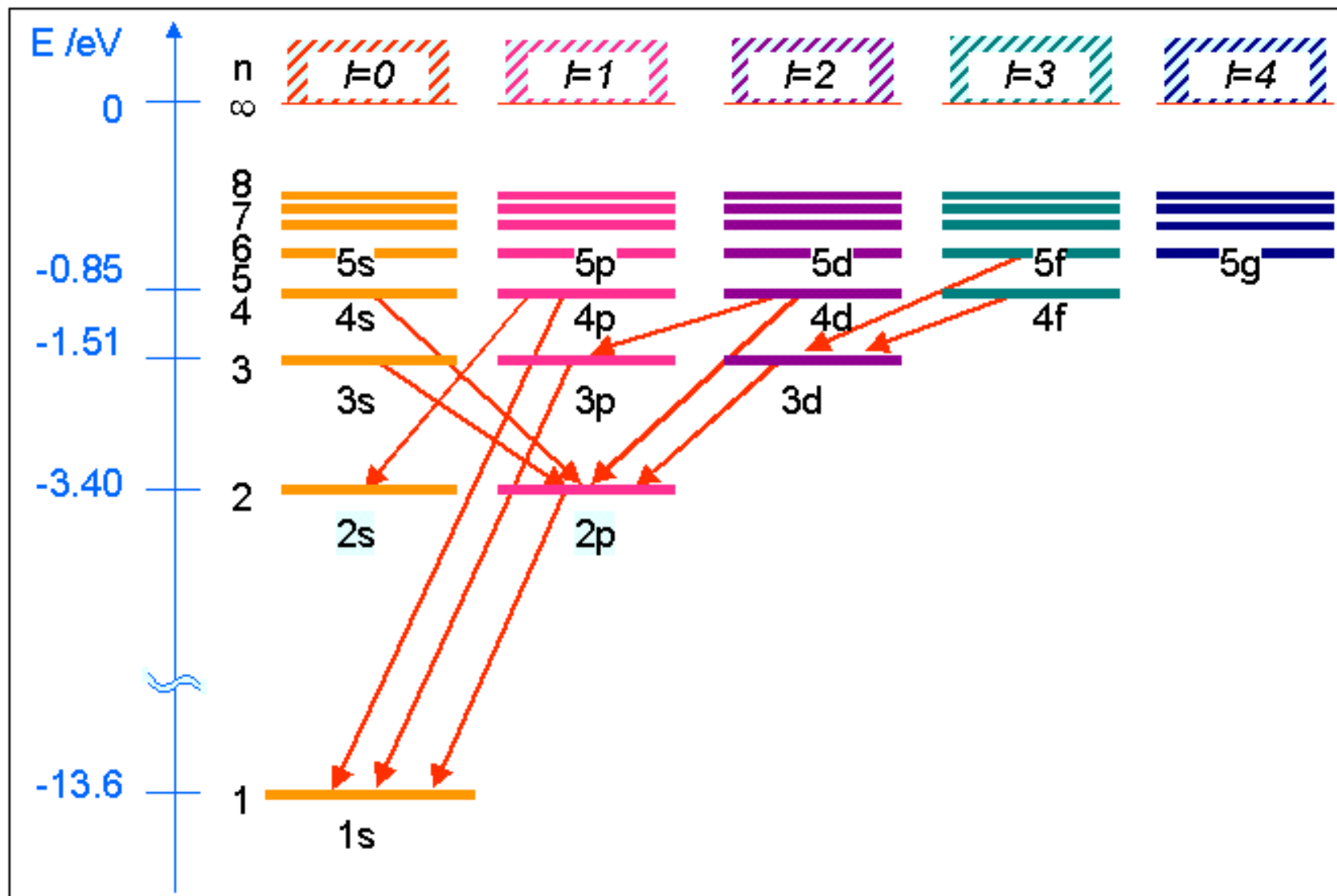












## “Spin one-half”

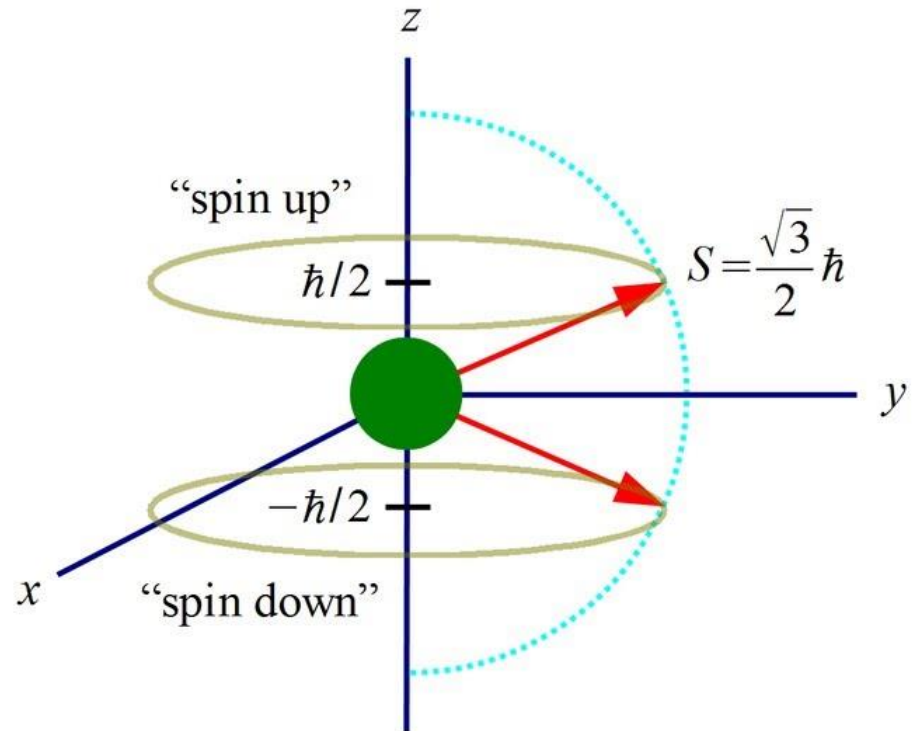
$$S = \sqrt{s(s+1)} \hbar$$

$$S_z = m_s \hbar$$

$$m_s = -s, -s+1, \dots, s$$

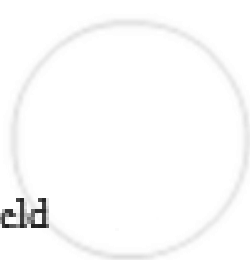
$$s = \frac{1}{2} \quad m_s = -\frac{1}{2}, \frac{1}{2}$$

2 values

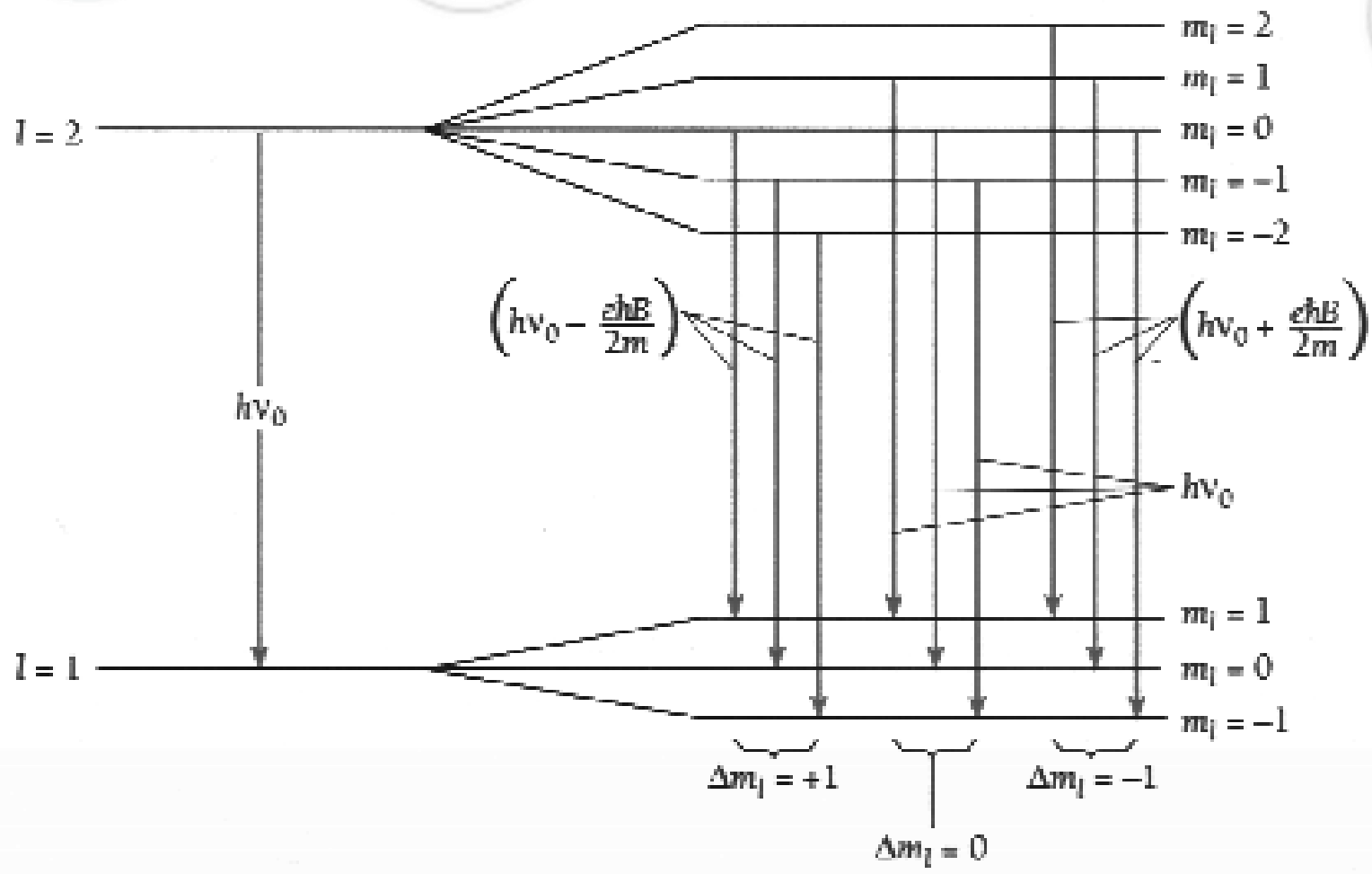




No magnetic field



Magnetic field present





$\lambda_0$

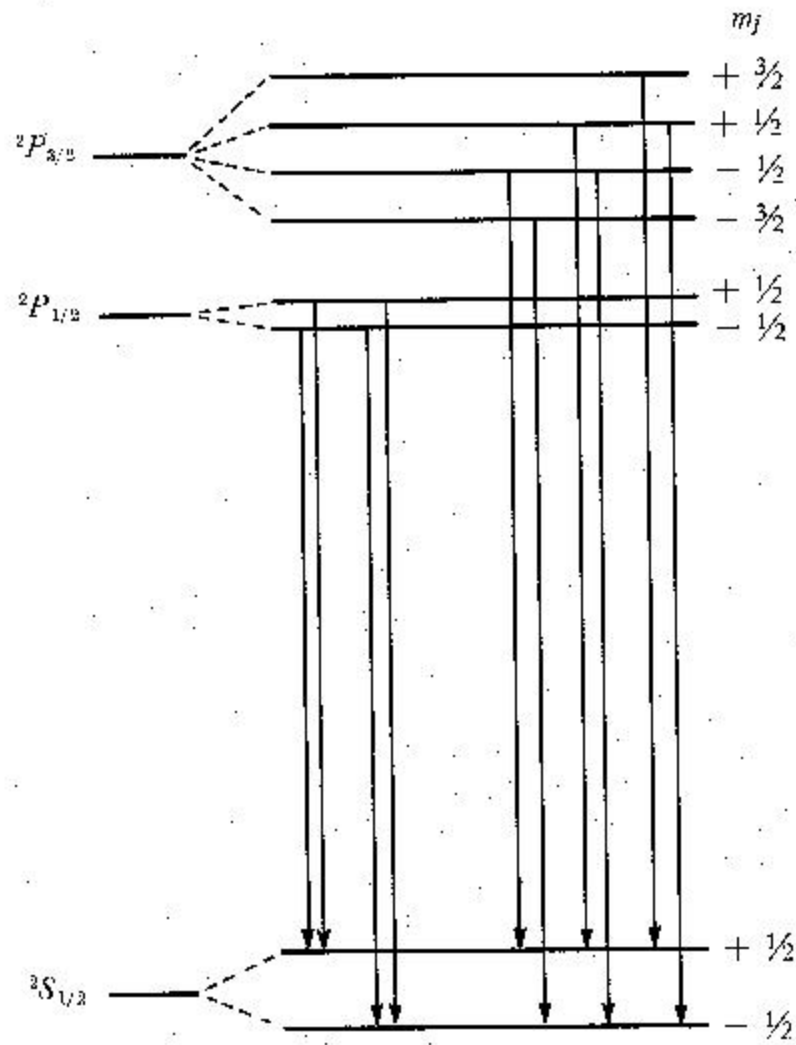
The spectral line  
in the absence of  
a magnetic field.



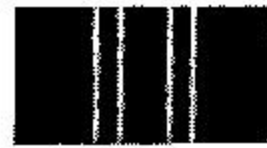
$\lambda_0 - \Delta\lambda$     $\lambda_0$     $\lambda_0 + \Delta\lambda$

In the presence of an  
external magnetic field,  
the line splits into three.





No field



Weak field

**Hvala za pozornost.**



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