

Hydrogen Atom States: Summary

Key Points:

n : principal quantum #

l : orbital quantum #

m_l : orbital magnetic quantum #

Energy depends only on n

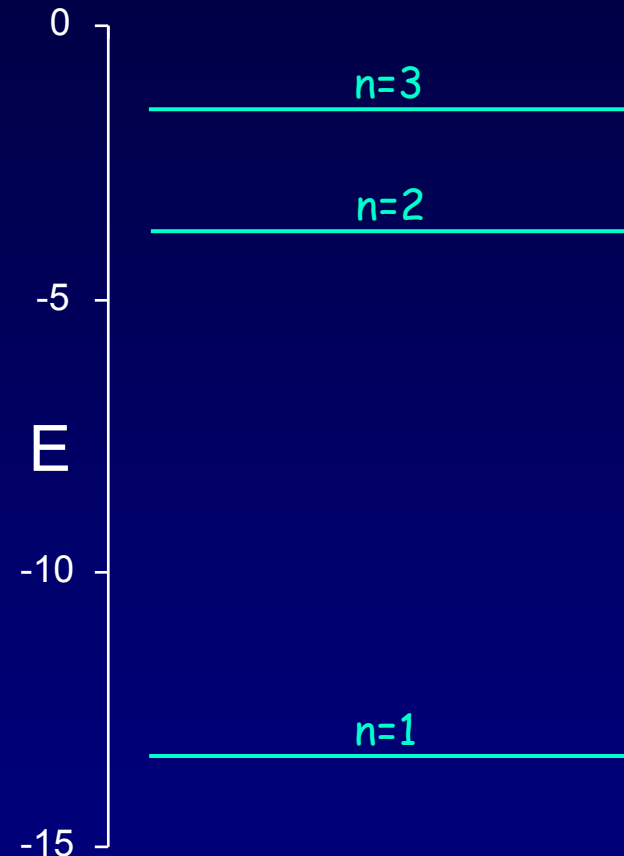
$$E_n = \frac{-ke^2}{2a_0} \frac{1}{n^2} = -\frac{13.6 \text{ eV}}{n^2}$$

For a given n , there are n possible angular momentum states:

$$l = 0, 1, \dots, n-1$$

For a given l , there are $2l + 1$

possible z-components: $m_l = -l, -(l-1), \dots, 0, \dots, (l-1), l$



Therefore, a level with quantum number n has n^2 degenerate states.