

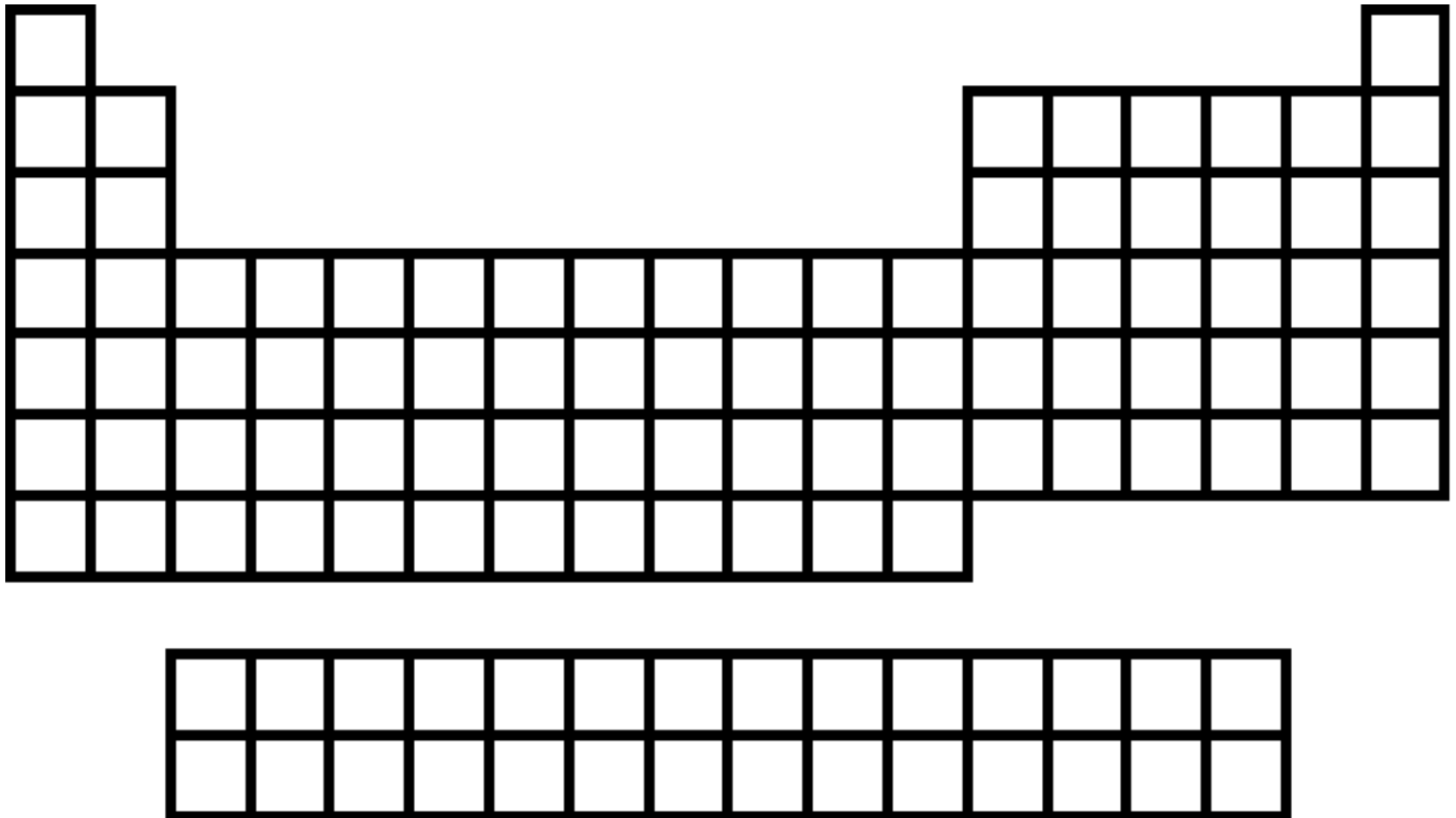
One Electron Multi-Level Atoms

Electronic structure of Alkali elements

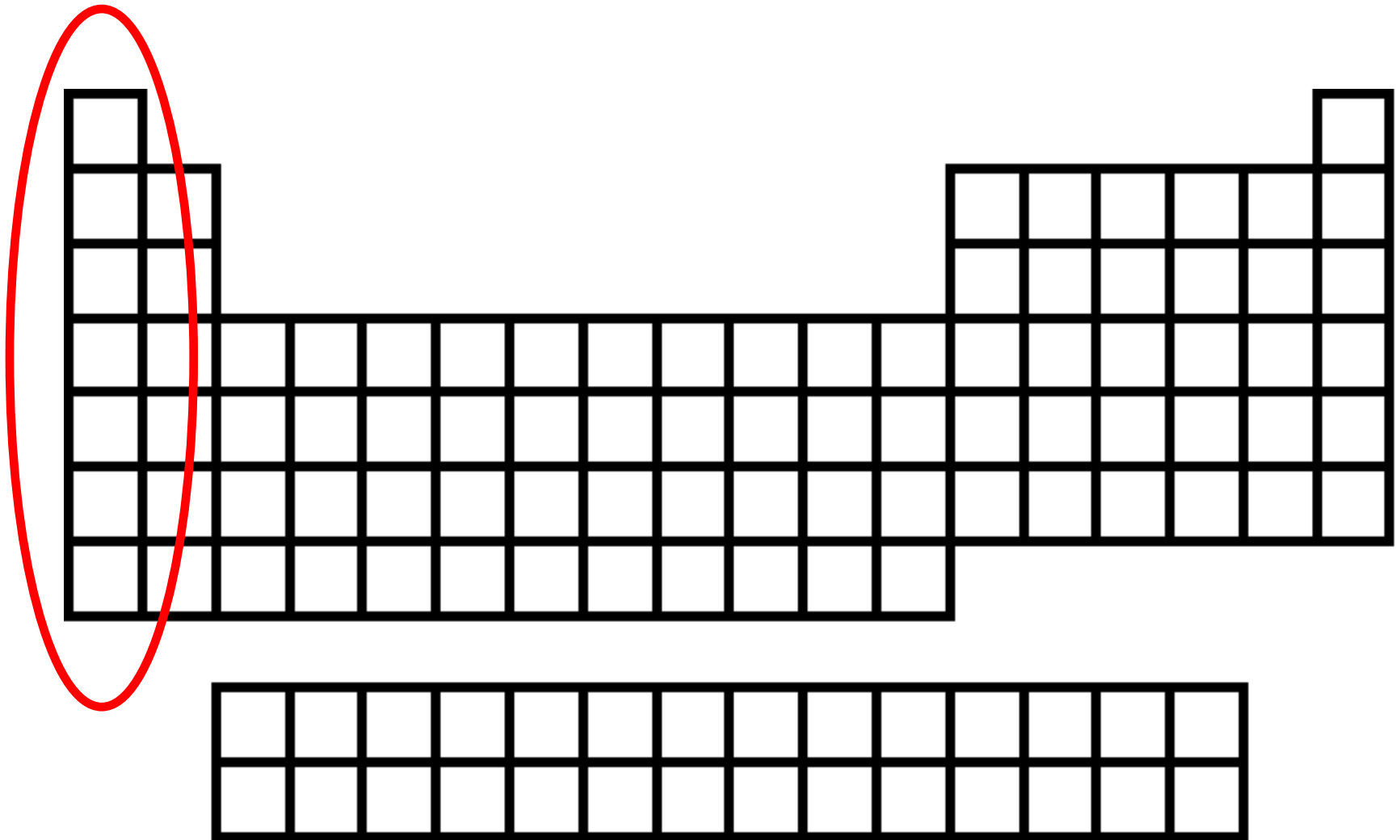
Outline

1. Basic structure
2. Fine structure
3. Hyperfine Structure
4. Zeeman splittings in a DC magnetic field.
5. Selection rules for E-M transitions.

The Alkali Elements



The Alkali Elements



The Alkali Elements

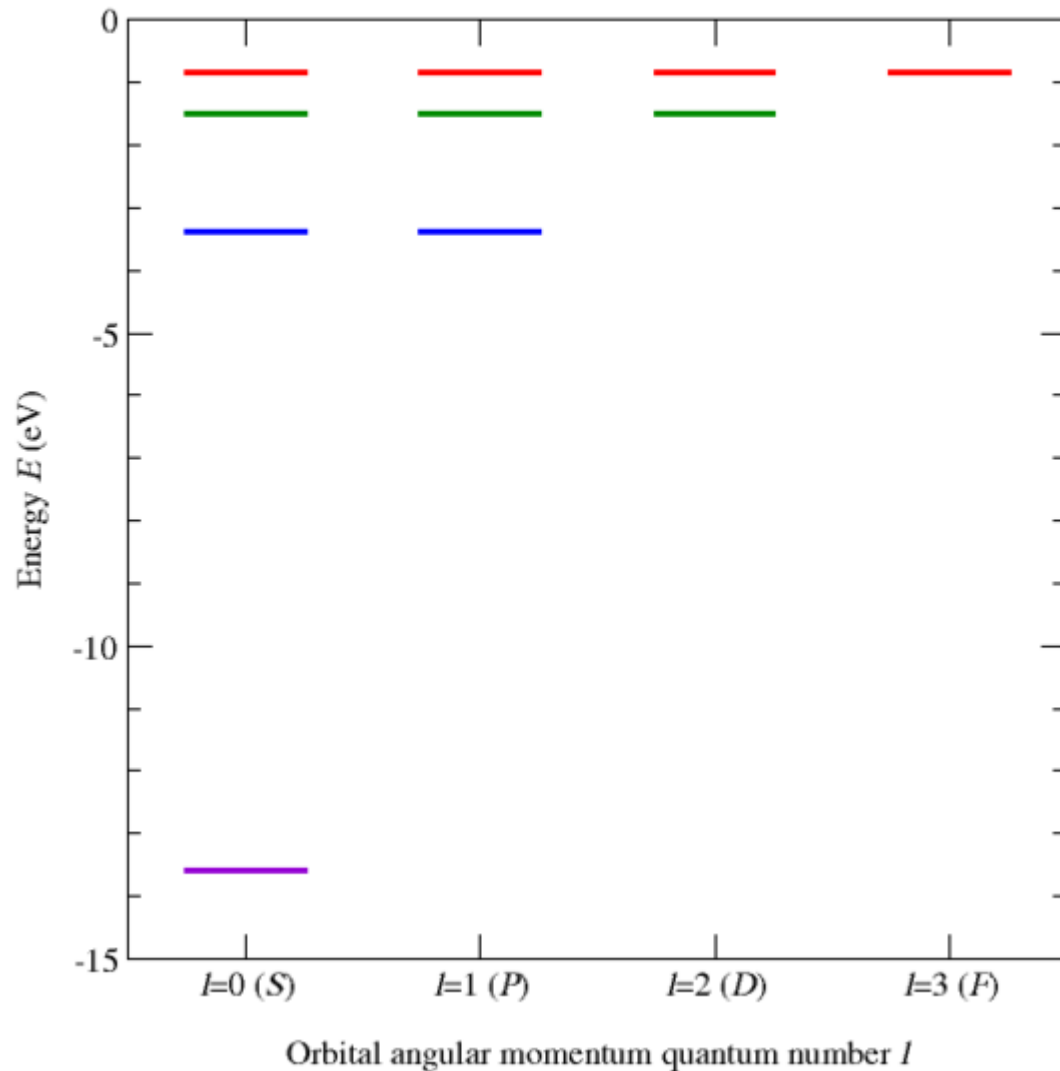
Alkali atoms = hydrogen-like atoms

(i.e. one valence electron)

[illegible]

Basic Energy Levels

Energy Levels of Hydrogen ($n=1-4$)



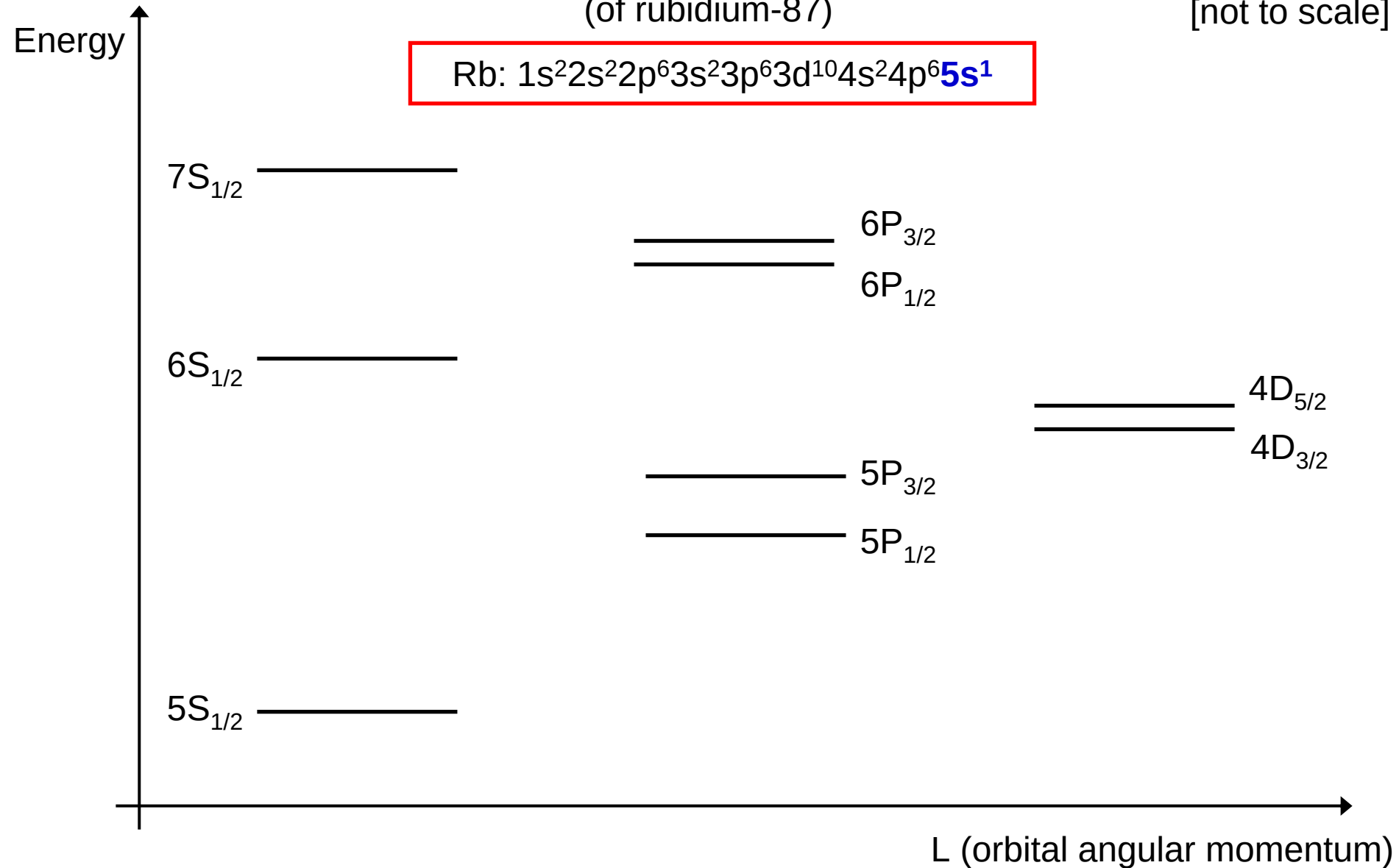
[Figure from wikipedia.org]

Fine Structure

(of rubidium-87)

[not to scale]

Rb: $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^6$ **$5s^1$**



Fine Structure: Notation

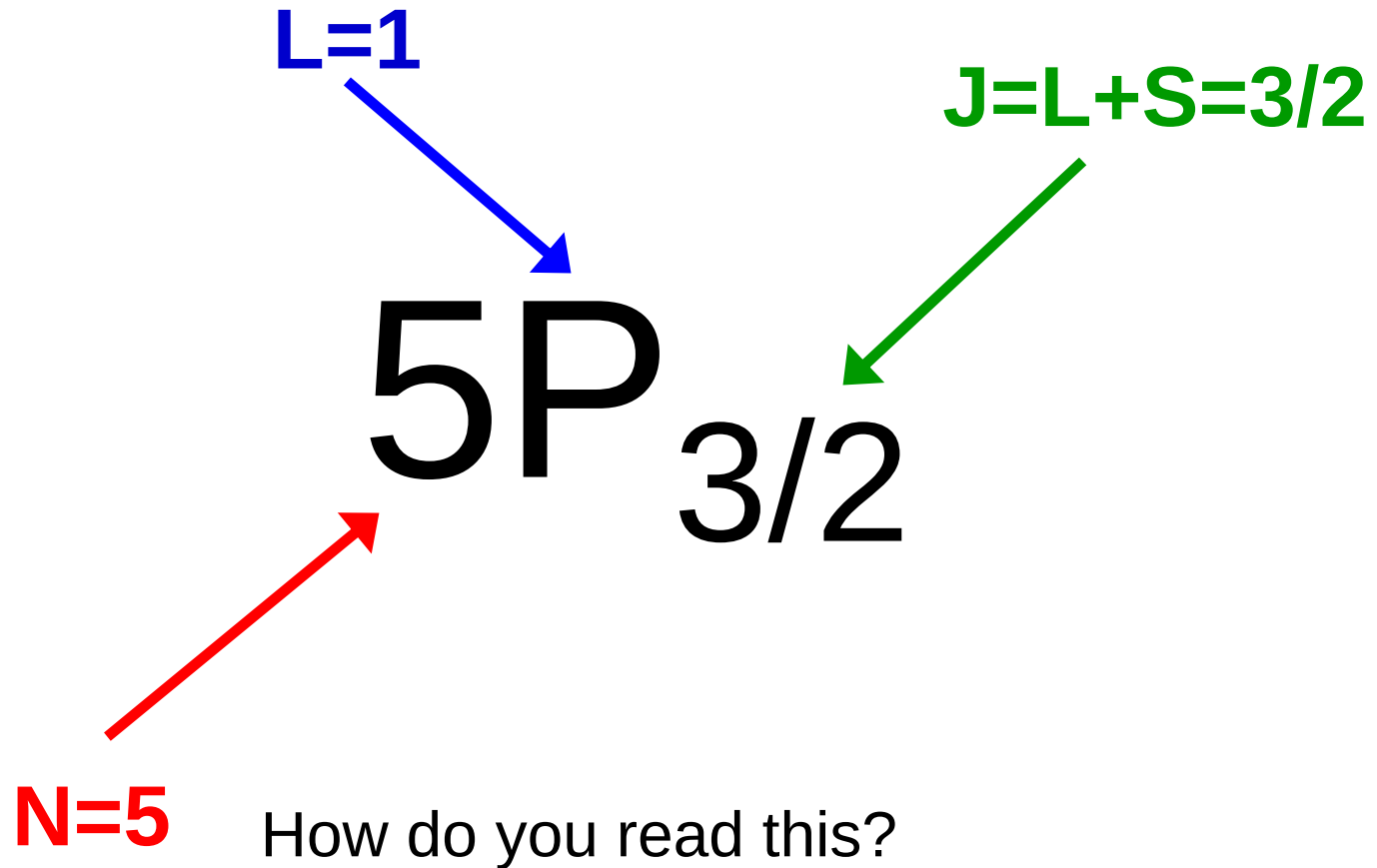
[Russell-Saunders notation]

$5P_{3/2}$

How do you read this?

Fine Structure: Notation

[Russell-Saunders notation]

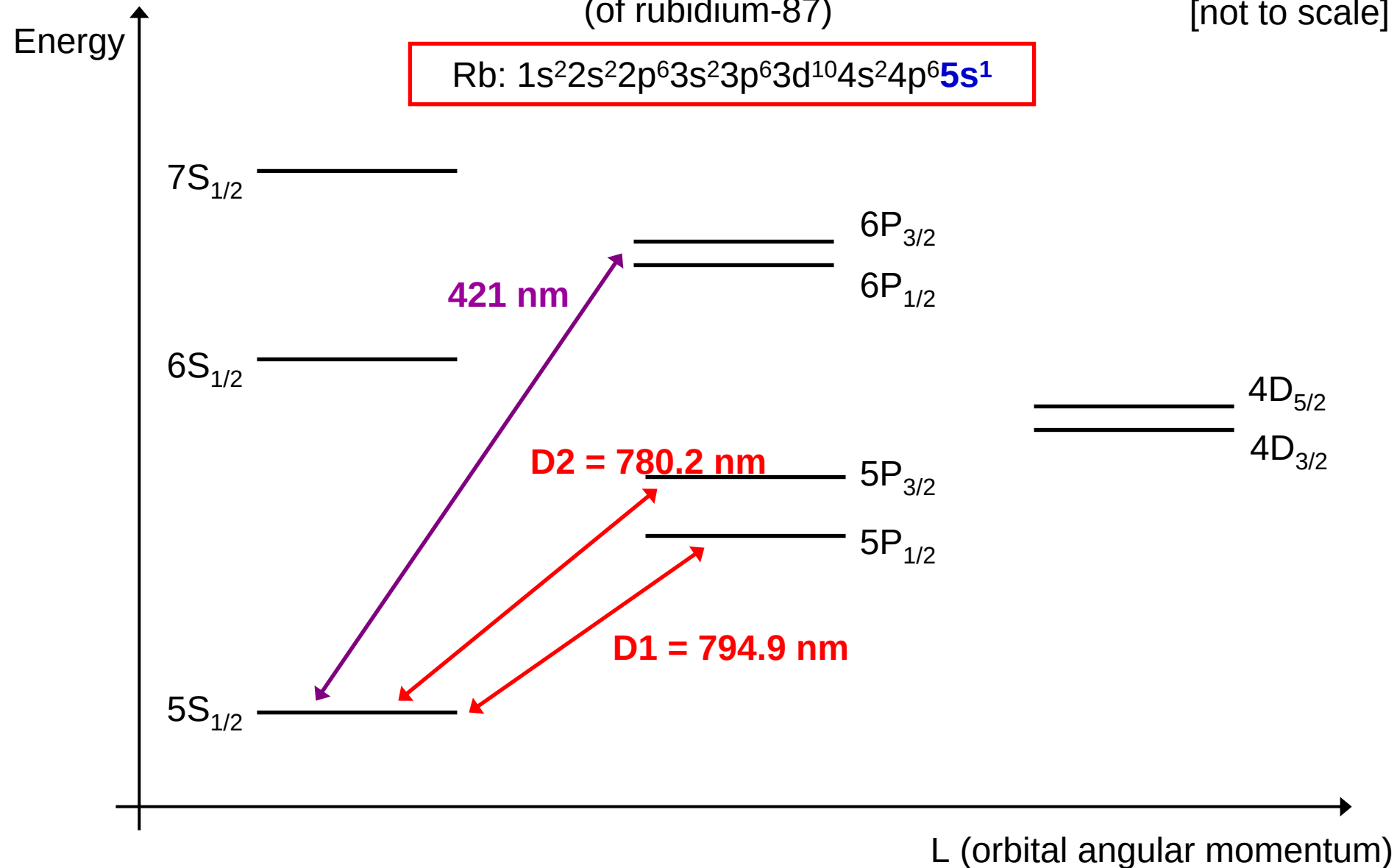


Fine Structure

(of rubidium-87)

[not to scale]

Rb: $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^6 5s^1$



Hyperfine Structure

(of rubidium-87)

[not to scale]

