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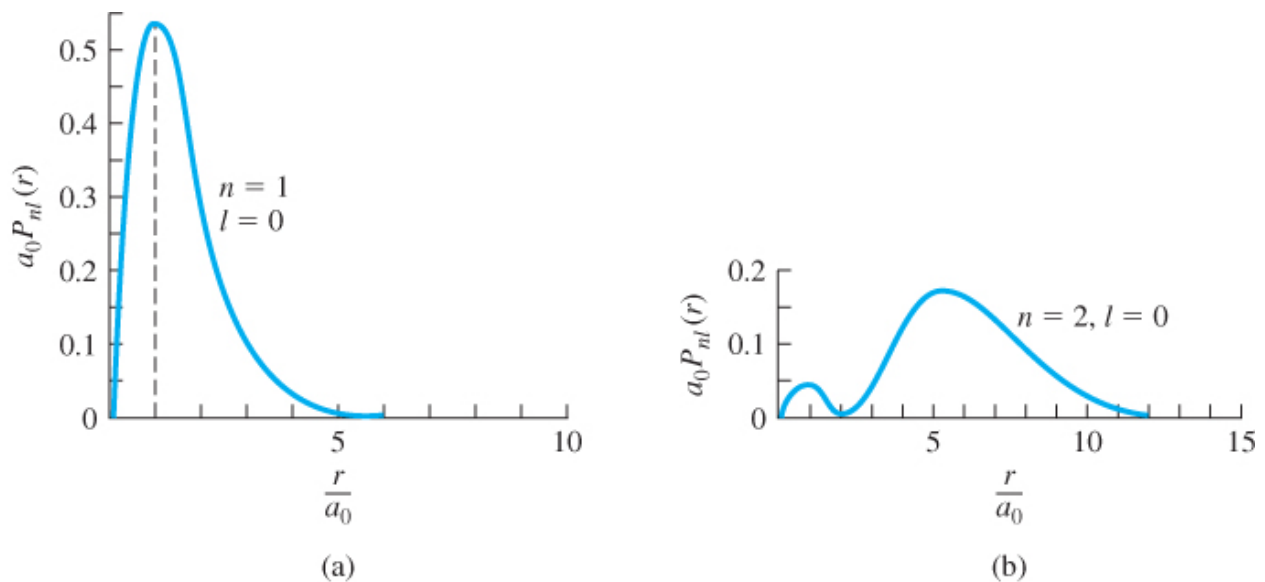

Figure 2.11 | The radial probability density function for the one-electron atom in the (a) lowest energy state and (b) next-higher energy state. *(From Eisberg and Resnick [5].)*

- Per (2.72) $|m| = \ell, \ell\text{-}1, \ldots, 0$. Therefore, $m = 0$ when $\ell = 0$.

- When $\ell = m = 0$, the solutions for the probability density functions $|\Psi|^2$ are spherically symmetric, i.e., $|\Psi(r)|^2$.

- For $|\Psi_{100}(r)|^2$ (AKA, 1*s* shell/state), note that the electron is most likely to be found near $r/a_0 = 1$ or $r = a_0 = 0.529$ Å.

- For $|\Psi_{200}(r)|^2$ (AKA, 2*s* shell/state), note that the electron is most likely to be found farther from the proton/nucleus at $5 < r/a_0 < 6$.