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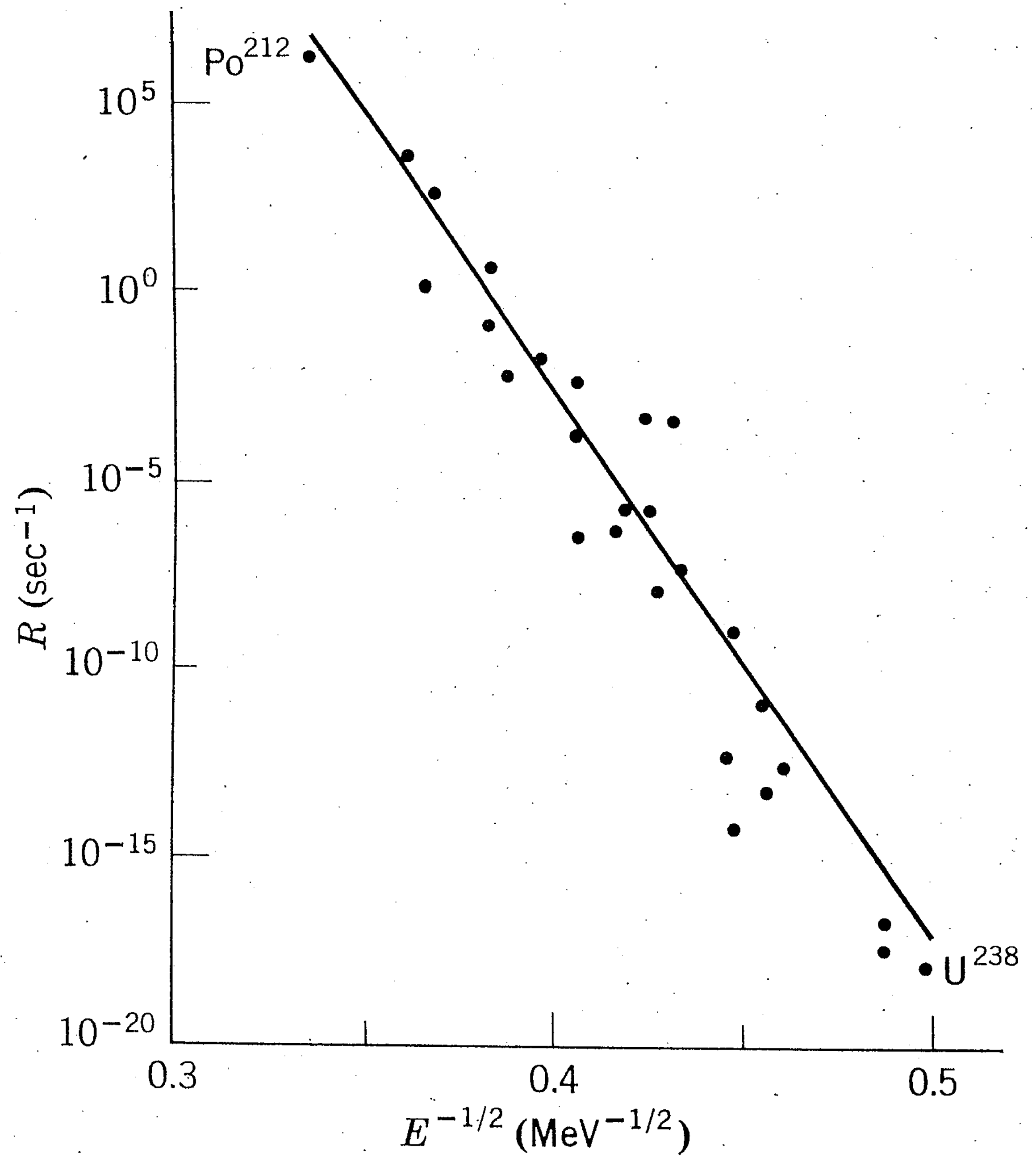

Figure 6-20 The probability per second R that a radioactive nucleus will emit an α particle of energy E. The points are experimental measurements and the solid curve is the prediction of (6-57), a result of barrier penetration theory.

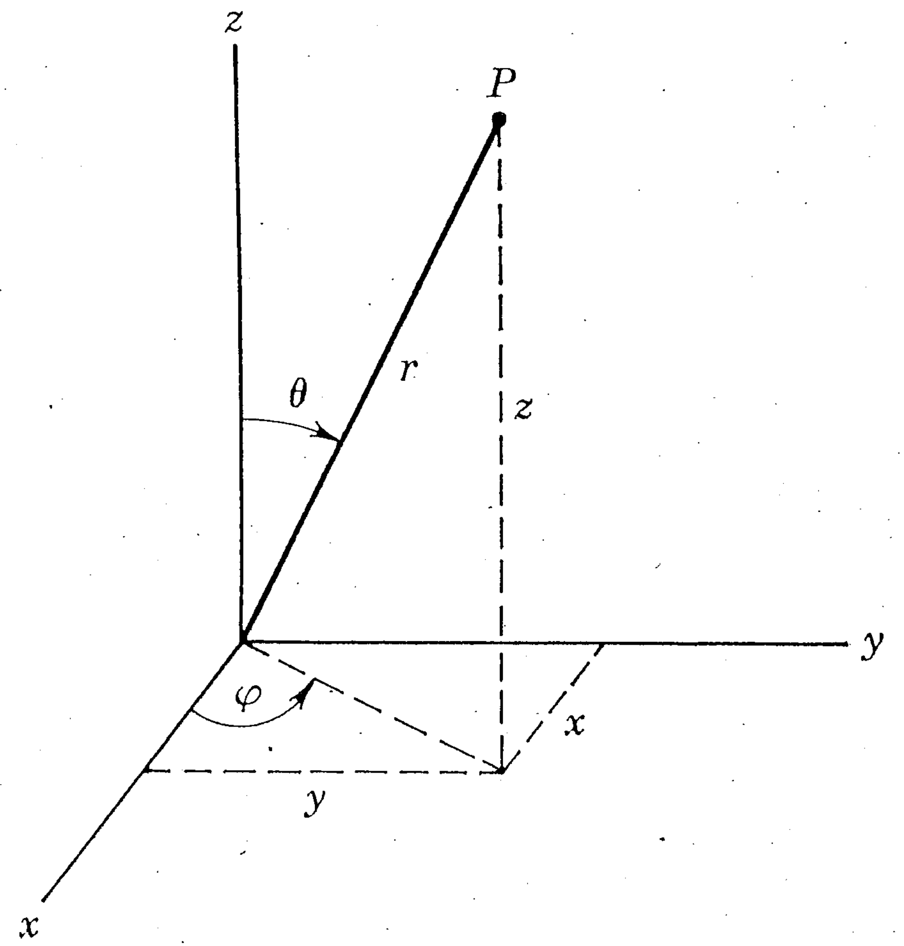

Figure 7-2 The spherical coordinates r, θ, φ of a point P, and its rectangular coordinates x, y, z.

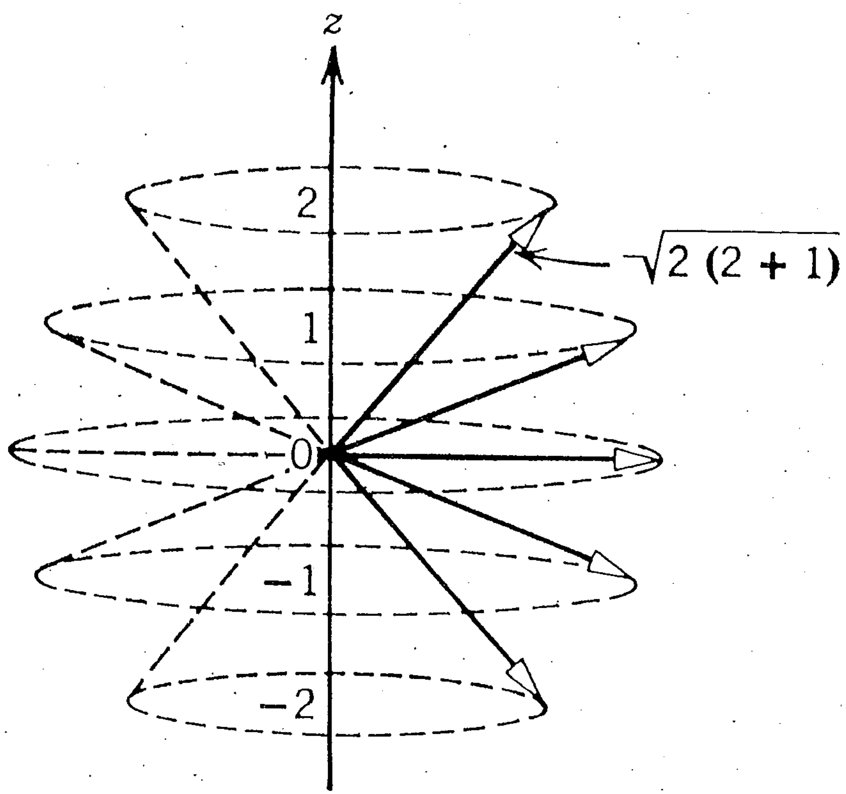

Figure 7-12 Representing the angular momentum vectors (measured in units of $\hbar$) for the possible states with $l = 2$. In each state the vector is equally likely to be found anywhere on a cone symmetrical about the z axis. It has a definite magnitude and z component but does not have a definite x or y component.

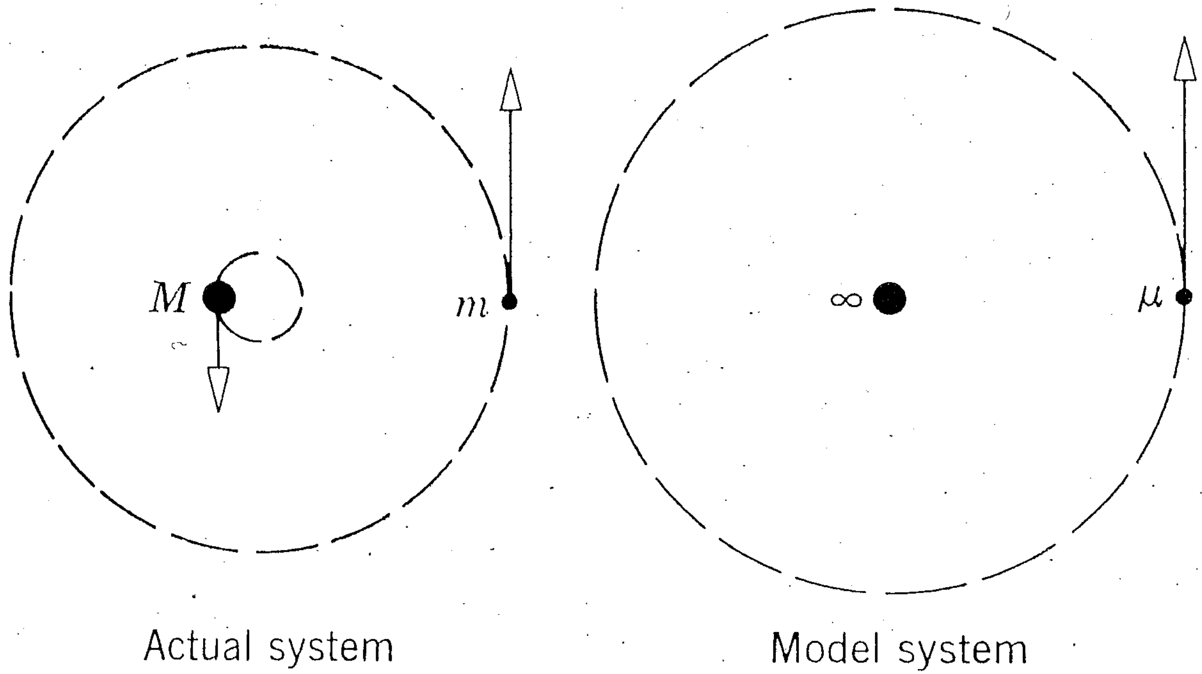

Figure 7-1 *Left:* In an actual one-electron atom, an electron of mass m and nucleus of mass M move about their fixed center of mass. *Right:* In the equivalent model atom, a particle of reduced mass μ moves about a stationary nucleus of infinite mass.

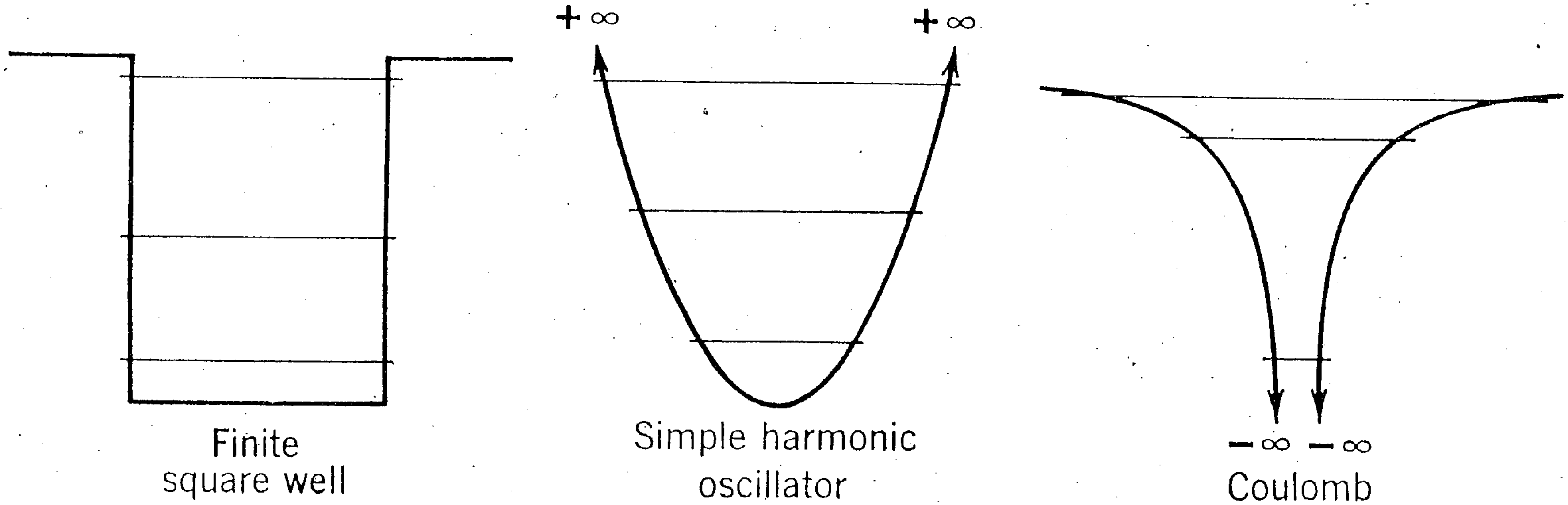

Figure 7-4 A comparison between the allowed energies of several binding potentials. The three-dimensional Coulomb potential is shown in a cross-sectional view along a diameter; the other potentials are one-dimensional.

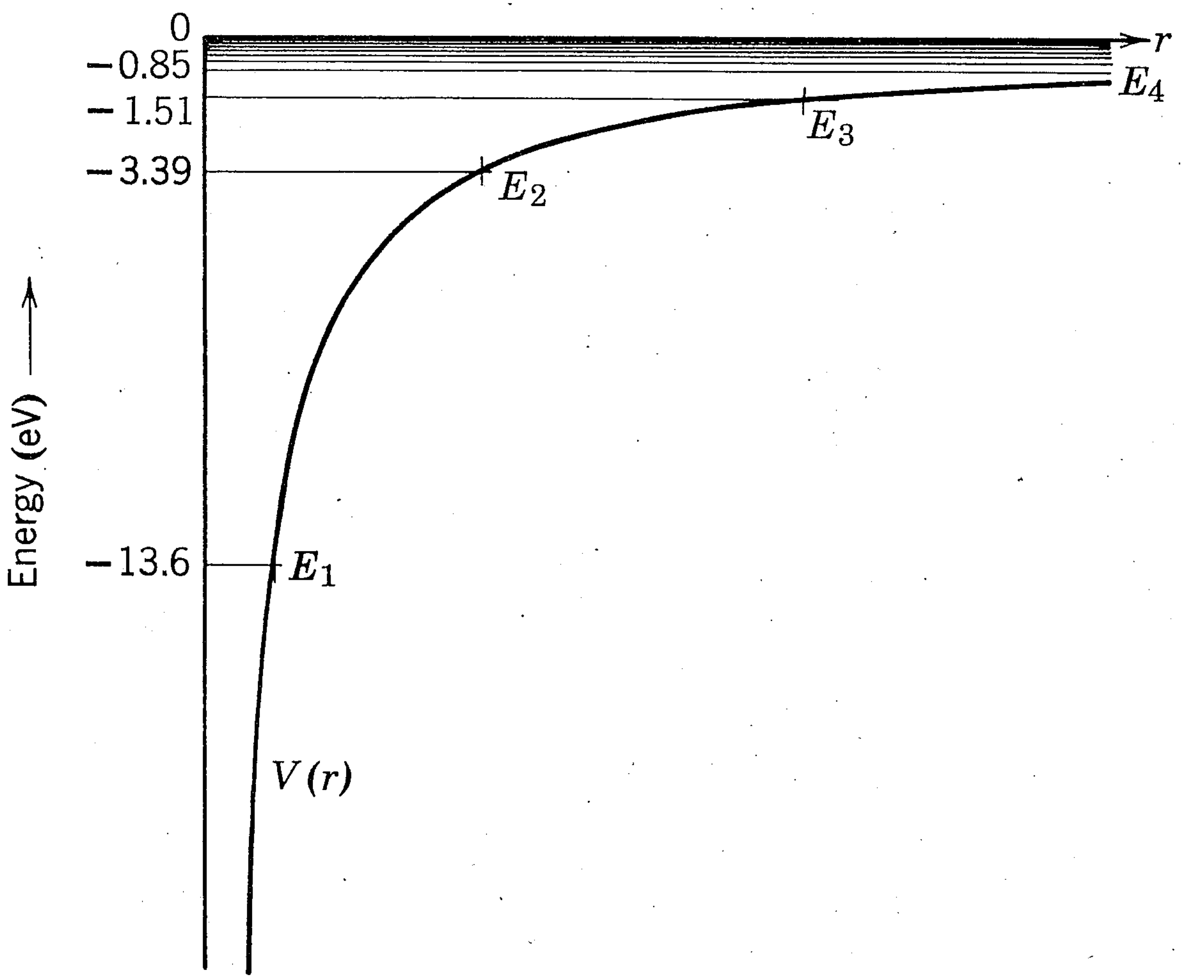

Figure 7-3 The Coulomb potential $V(r)$ and its eigenvalues E_n. For large values of n the eigenvalues become very closely spaced in energy since E_n approaches zero as n approaches infinity. Note that the intersection of $V(r)$ and E_n, which defines the location of one end of the classically allowed region, moves out as n increases. Not shown in this figure is the continuum of eigenvalues at positive energies corresponding to unbound states.

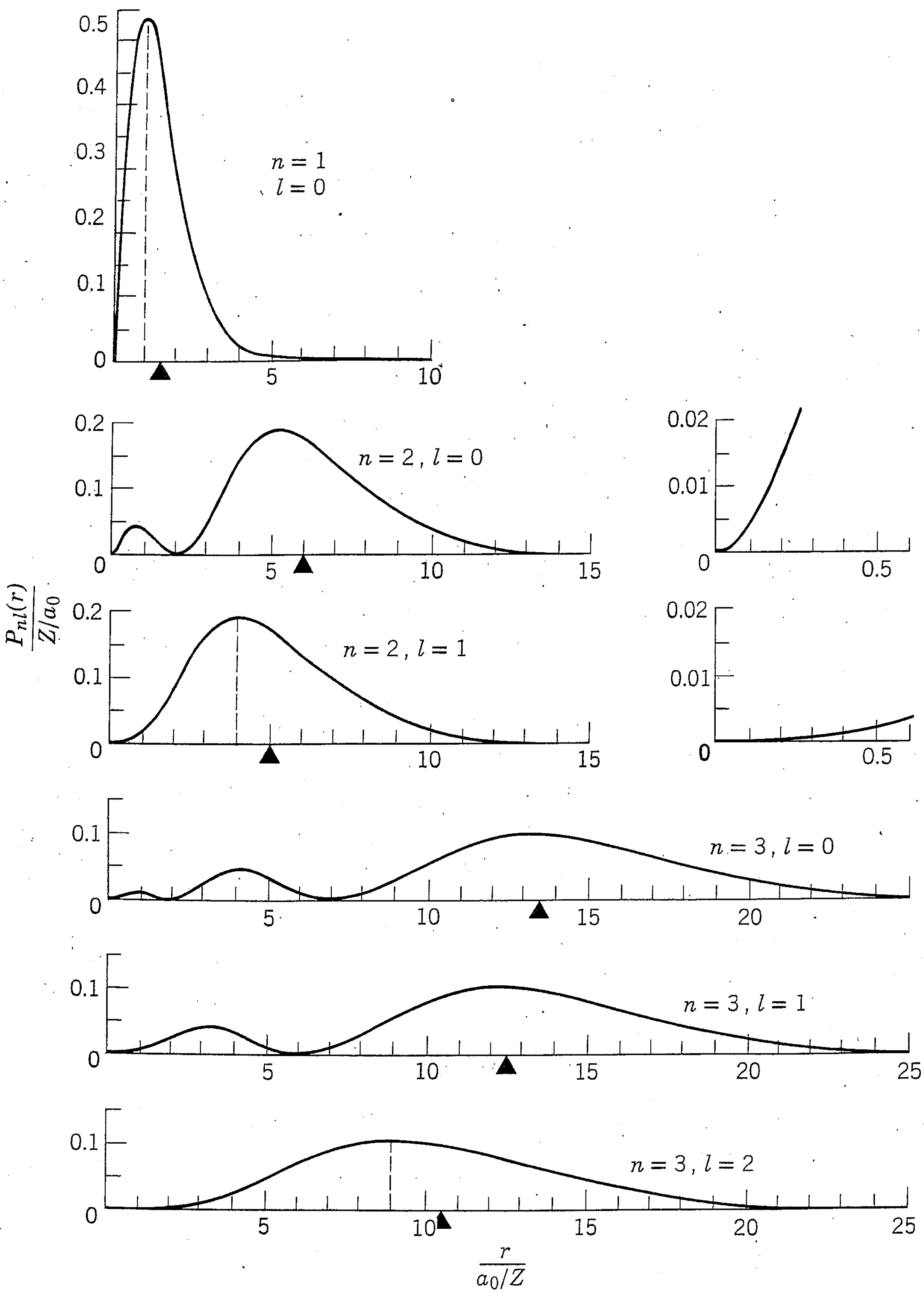

Figure 7-5 The radial probability density for the electron in a one-electron atom for $n =$ 1, 2, 3 and the values of l shown. The triangle on each abscissa indicates the value of $\overline{r_{nl}}$ as given by (7-29). For $n = 2$ the plots are redrawn with abscissa and ordinate scales expanded by a factor of 10 to show the behavior of $P_{nl}(r)$ near the origin. Note that in the three cases for which $l = l_{\max} = n - 1$ the maximum of $P_{nl}(r)$ occurs at $r_{\text{Bohr}} = n^2 a_0/Z$, which is indicated by the location of the dashed line.

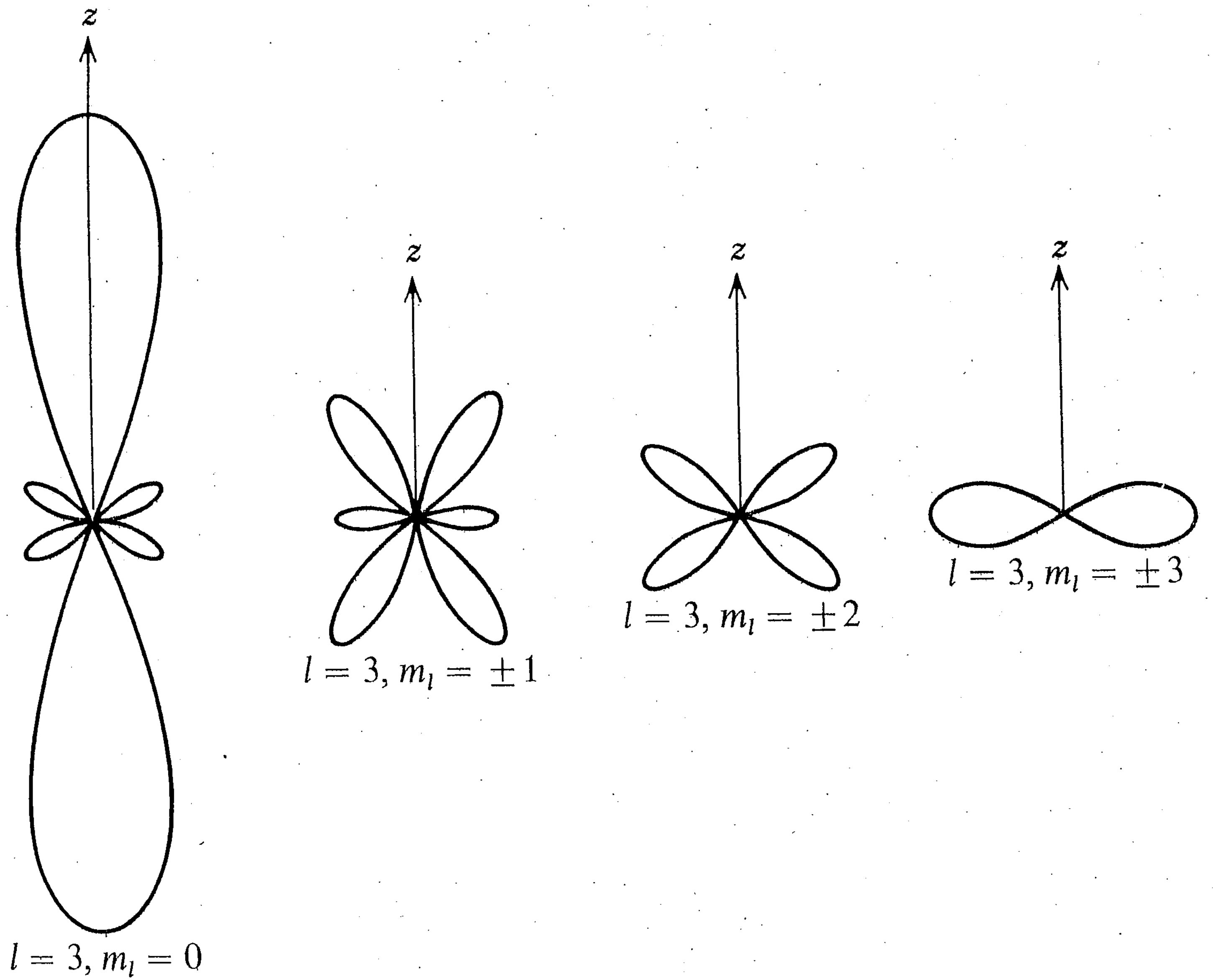

Figure 7-8 Polar diagrams of the directional dependence of the one-electron atom probability densities for $l = 3$; $m_l = 0, \pm 1, \pm 2, \pm 3$.

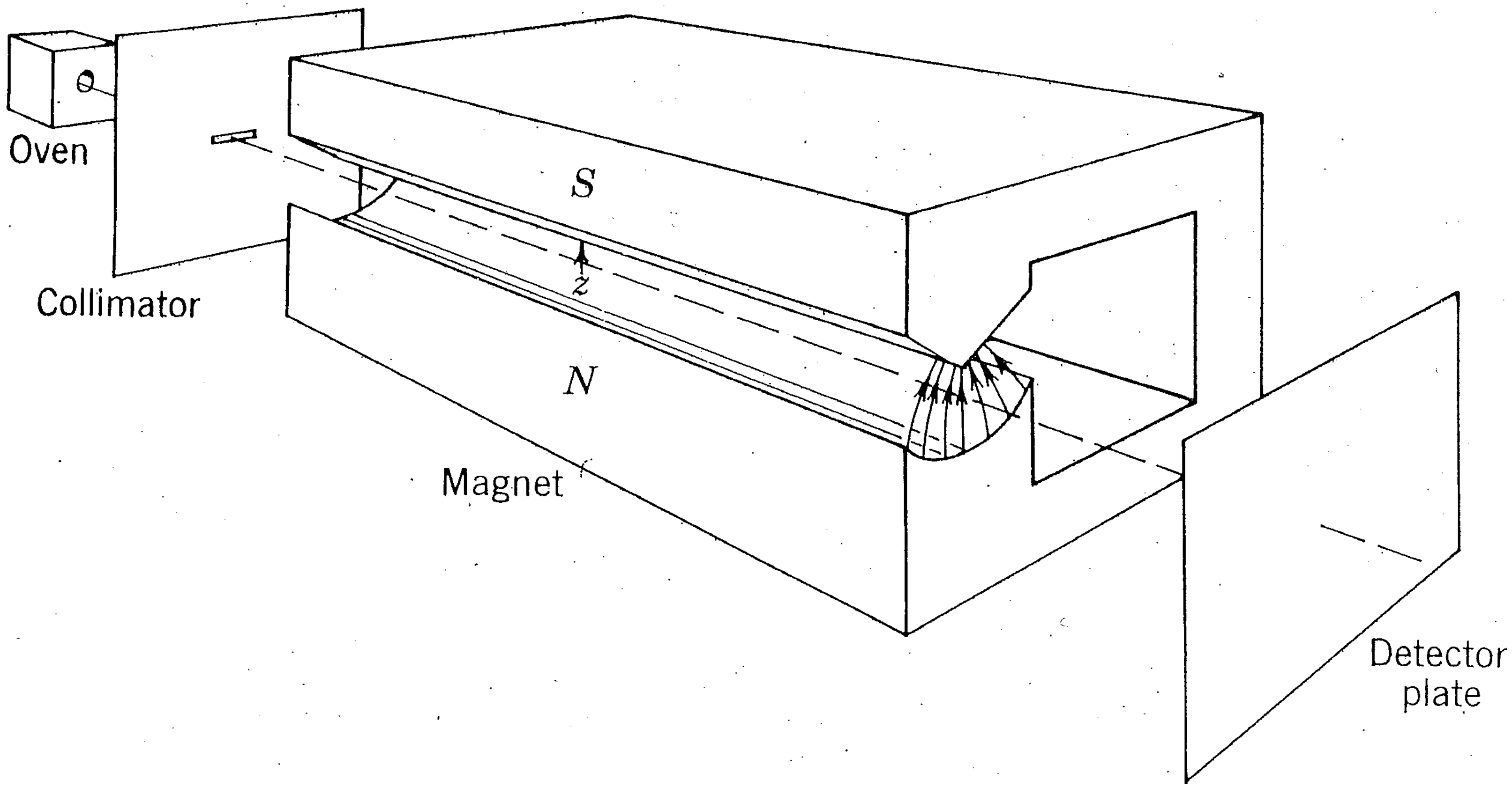

Figure 8-5 The Stern-Gerlach apparatus. The field between the two magnet pole pieces is indicated by the field lines drawn at the near end of the magnet. The field intensity increases most rapidly in the positive z direction (upward).