CHAPTER OVERVIEW

8: Central Potentials

In this chapter, we shall investigate the interaction of a non-relativistic particle of mass m and energy E with various so-called *central potentials*, $V(r)$, where $r = (x^2 + y^2 + z^2)^{1/2}$ is the radial distance from the origin. It is, of course, most convenient to work in spherical coordinates—r, θ, ϕ—during such an investigation. (See Section [s8.3].) Thus, we shall be searching for stationary wavefunctions, $\psi(r, \theta, \phi)$, that satisfy the time-independent Schrödinger equation (see Section [sstat])

$$H\,\psi = E\,\psi, \tag{8.1}$$

where the Hamiltonian takes the standard non-relativistic form

$$H = \frac{p^2}{2\,m} + V(r). \tag{8.2}$$

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