

Fig. 16.1. Radial scattering wave function $R_\ell(k, r)$ in an attractive Coulomb potential. In each of the four plots the total energy E is varied but the angular-momentum quantum number ℓ is kept fixed. The latter is varied from plot to plot.

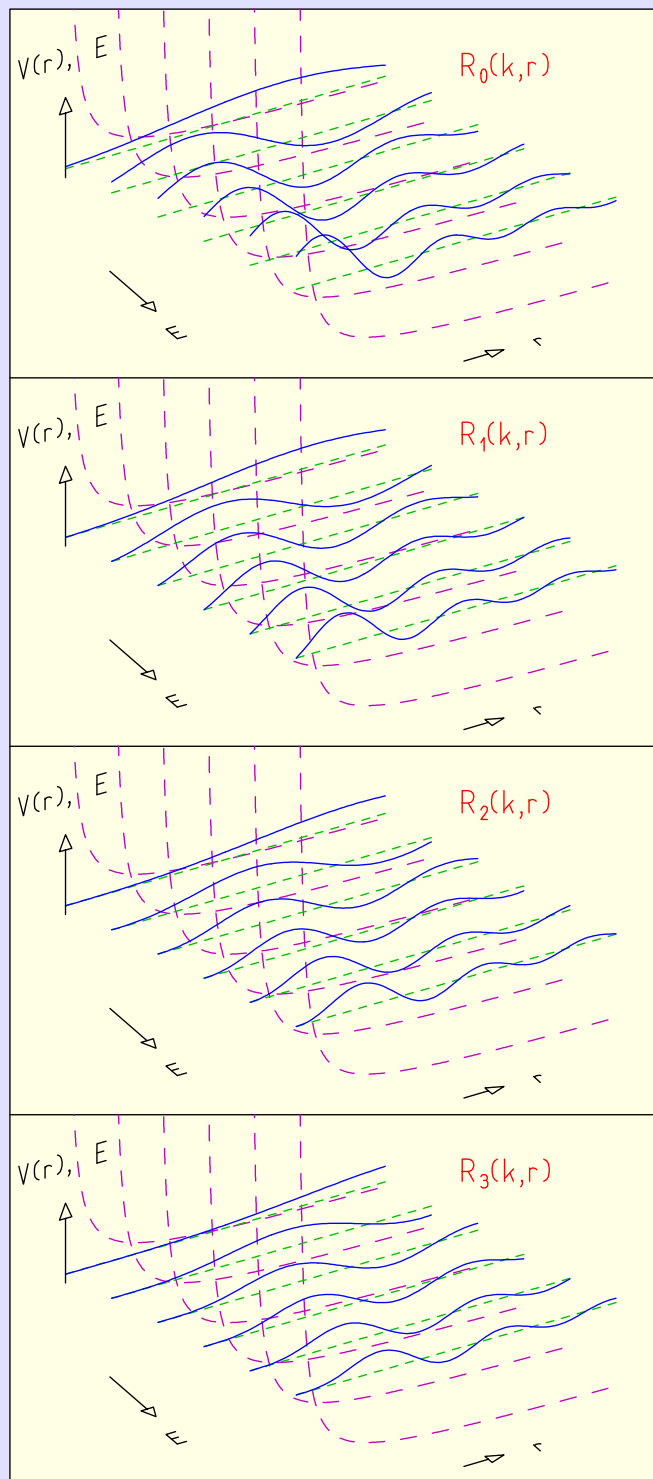


Fig. 16.2. As Figure 16.1 but for a repulsive Coulomb potential.

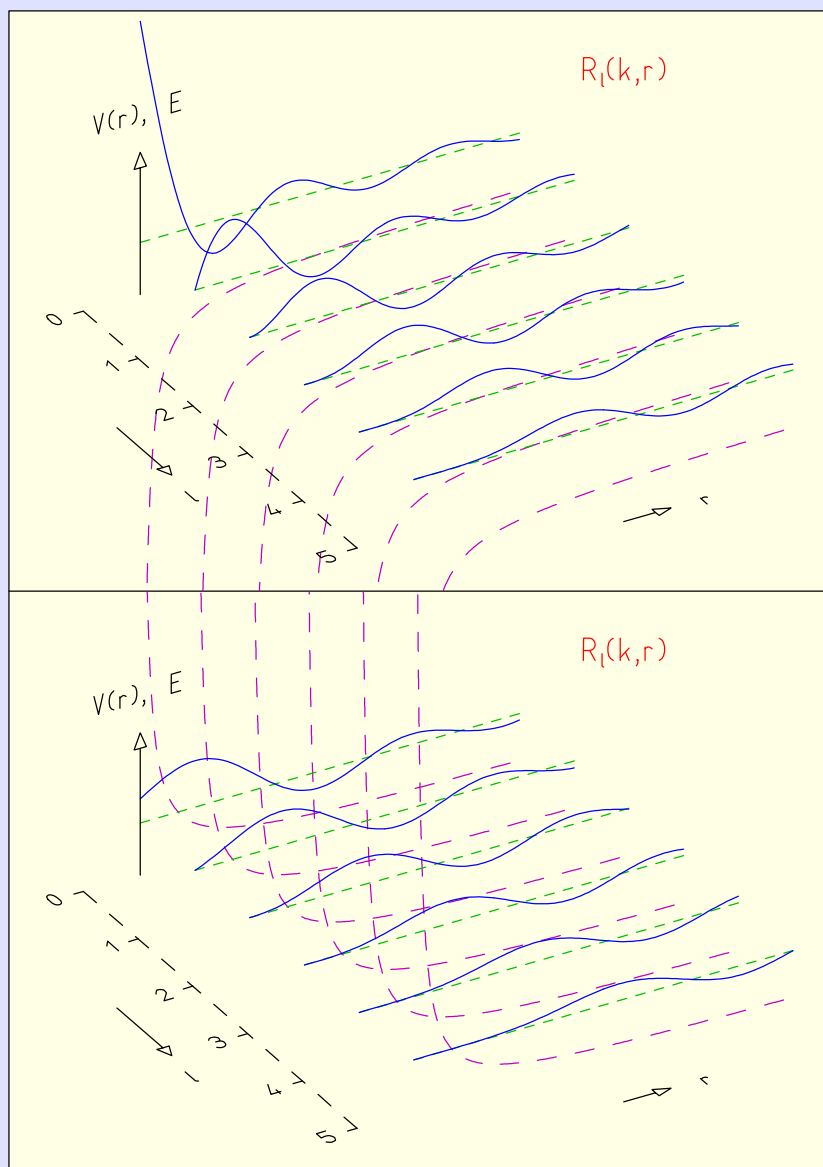


Fig. 16.3. Radial scattering wave function $R_\ell(k, r)$ in an attractive (top) and in a repulsive (bottom) Coulomb potential for different values ℓ of the angular-momentum quantum number but for fixed energy.

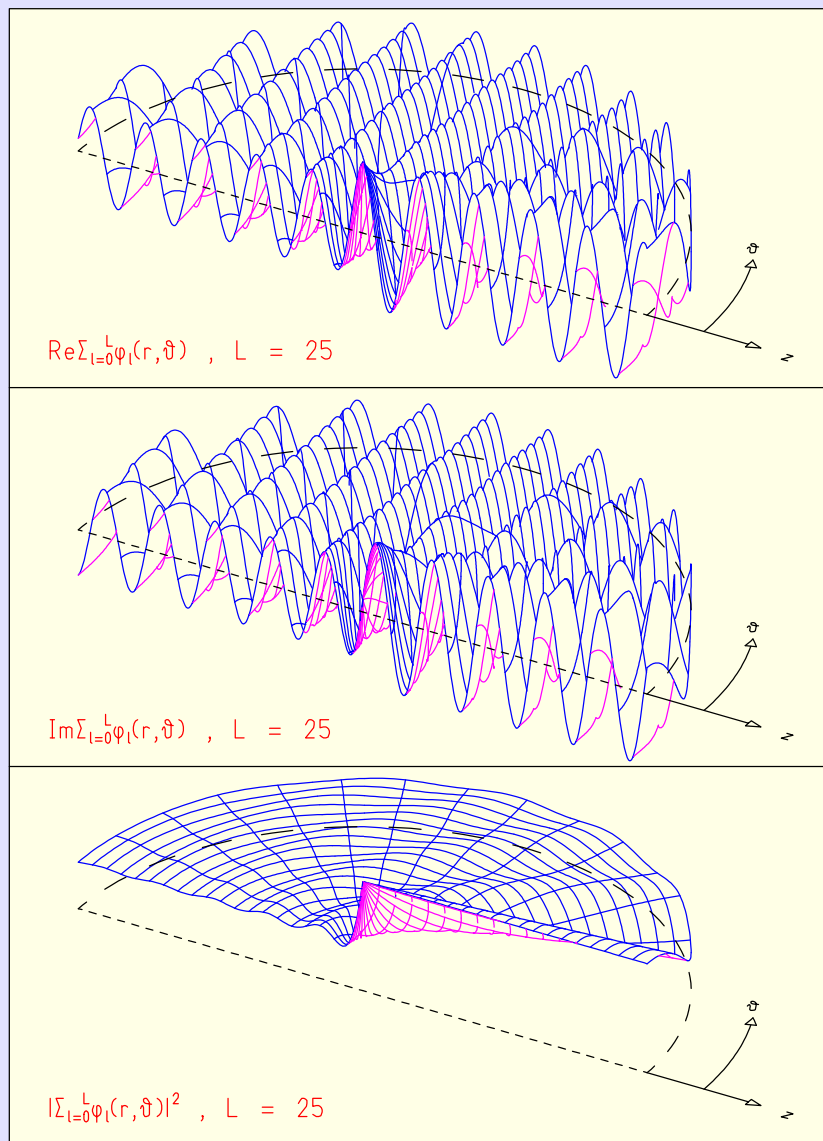


Fig. 16.4. Stationary wave function $\varphi(r)$ for the scattering of an incoming Coulomb wave by an attractive Coulomb potential. Shown are the real part, the imaginary part, and the absolute square of $\varphi(r)$.

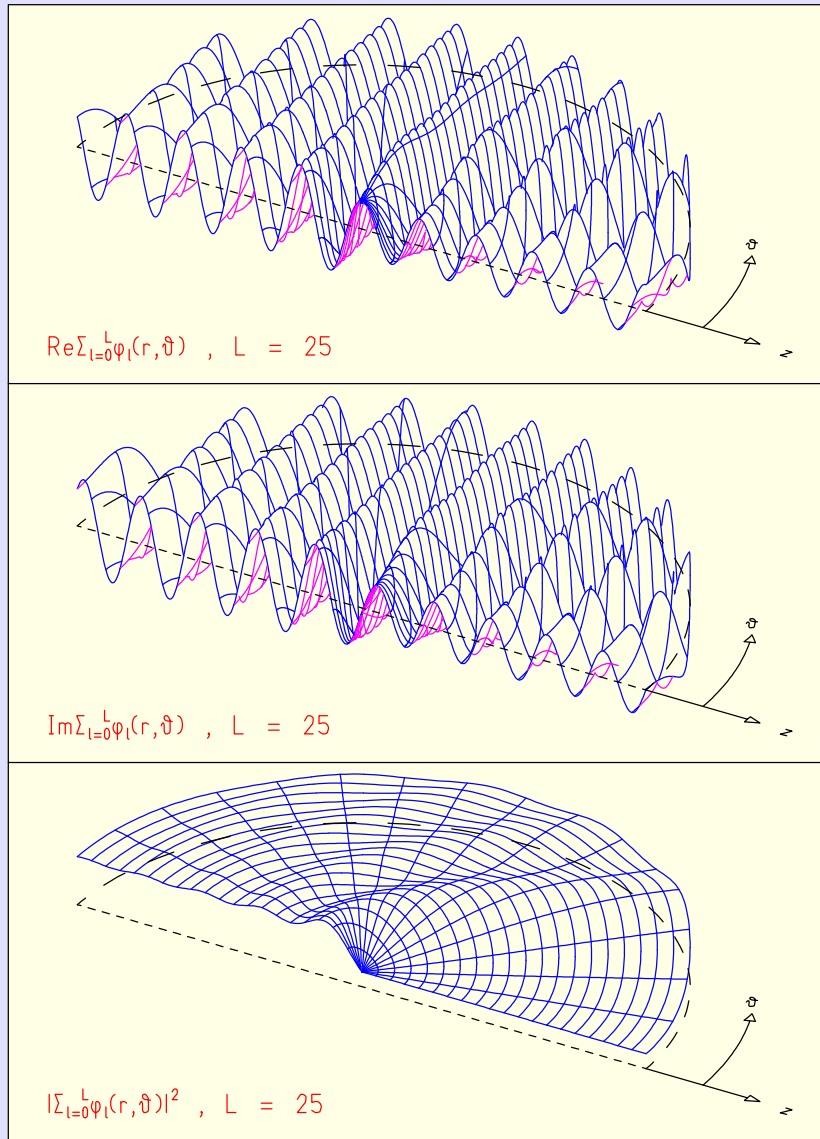


Fig. 16.5. As Figure 16.4 but for a repulsive Coulomb potential.

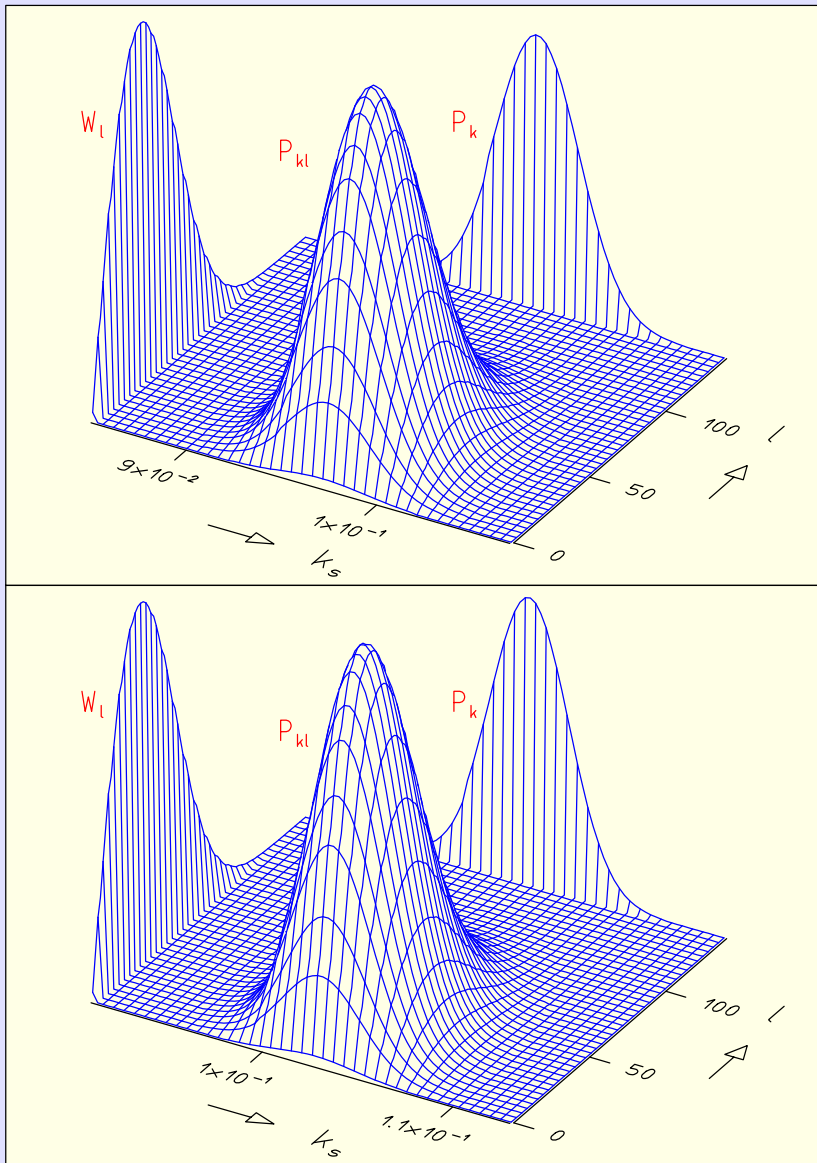


Fig. 16.6. Probability distributions $P_\ell(k)$ and marginal distributions W_ℓ and $P(k)$ for the wave packet used in attractive (top) and repulsive (bottom) Coulomb scattering in Figure 16.7 and 16.8, respectively.

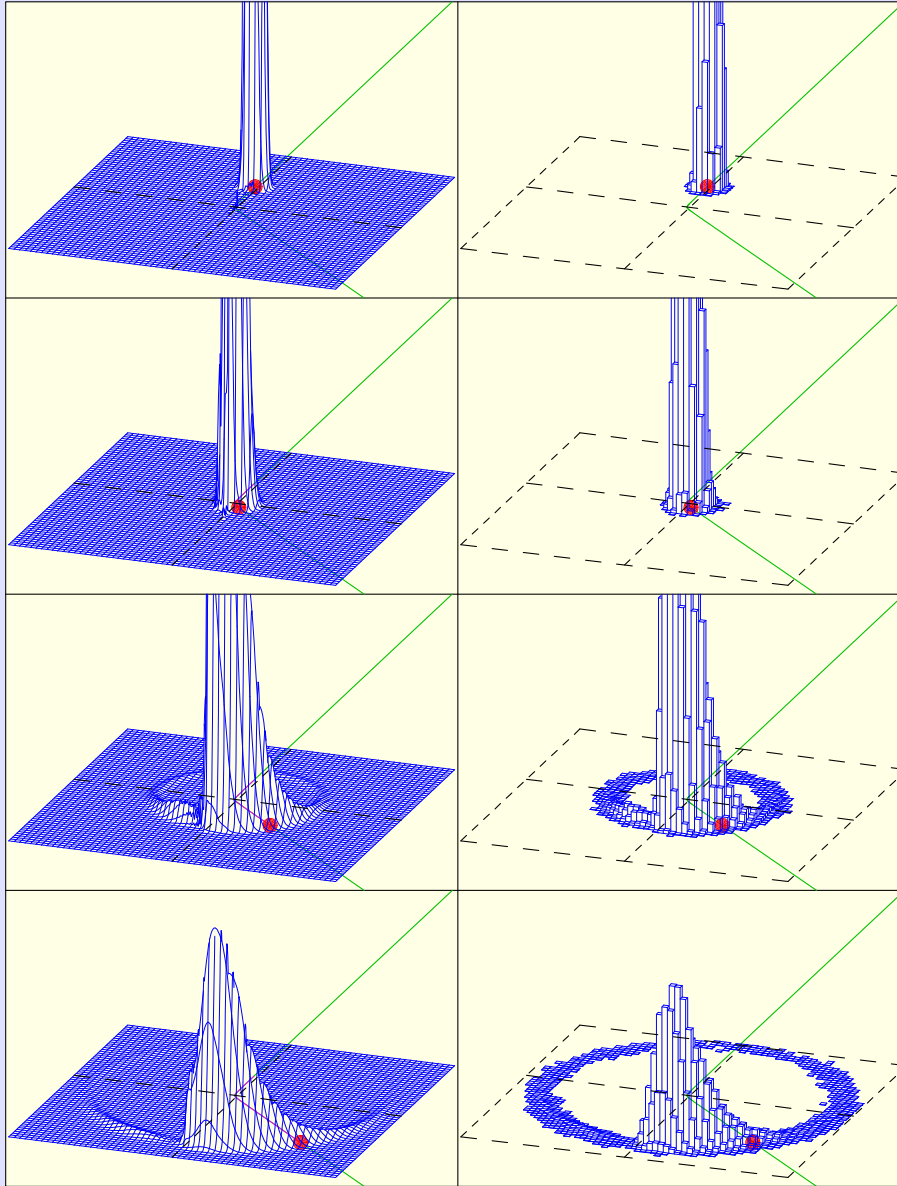


Fig. 16.7. Left: Time development of the spatial probability density of an initially Gaussian wave packet undergoing attractive Coulomb scattering. The trajectory of the corresponding classical particle is a hyperbola and indicated by the solid line. The density is shown in the plane of the classical trajectory for four moments in time. The position is marked by a dot. Right: The corresponding time development for the spatial probability density in a classical phase-space distribution.

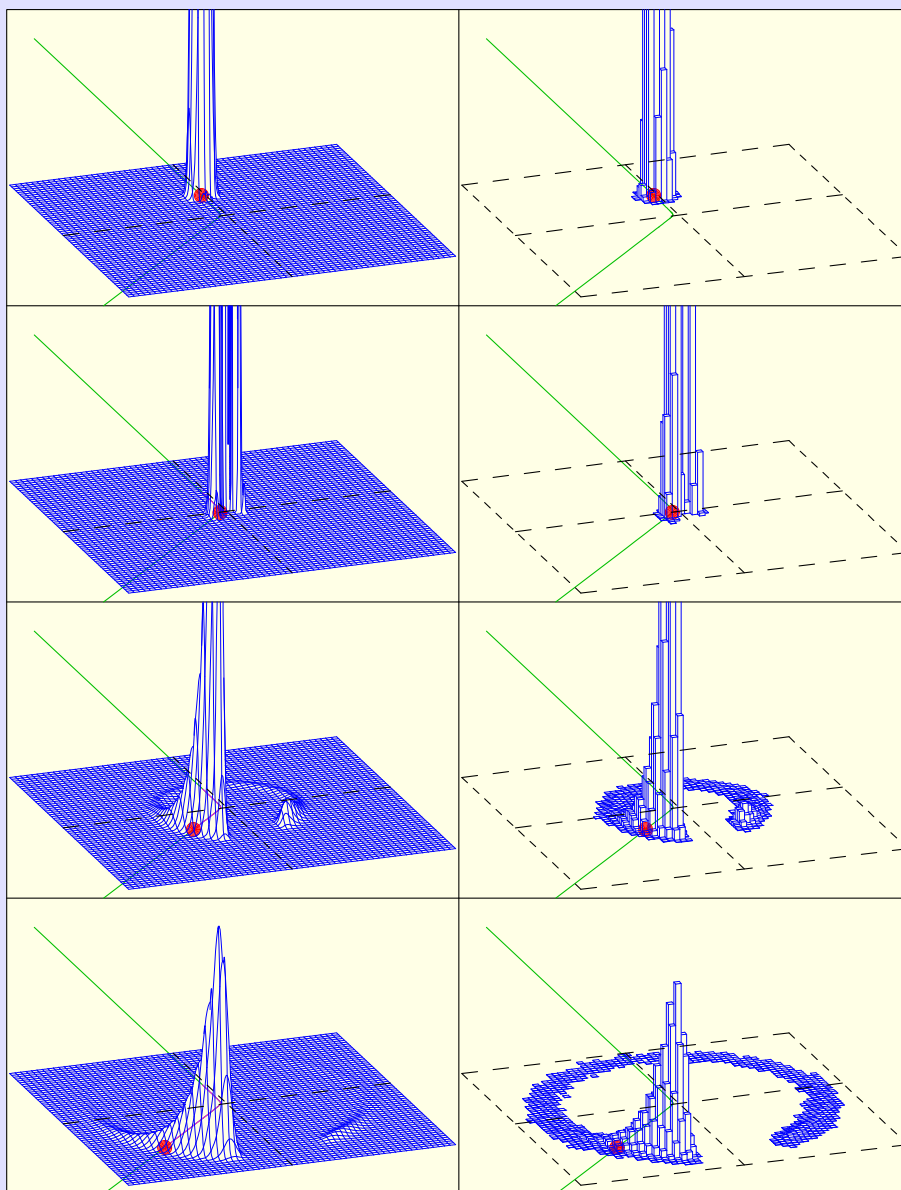


Fig. 16.8. As Figure 16.7 but for repulsive scattering.

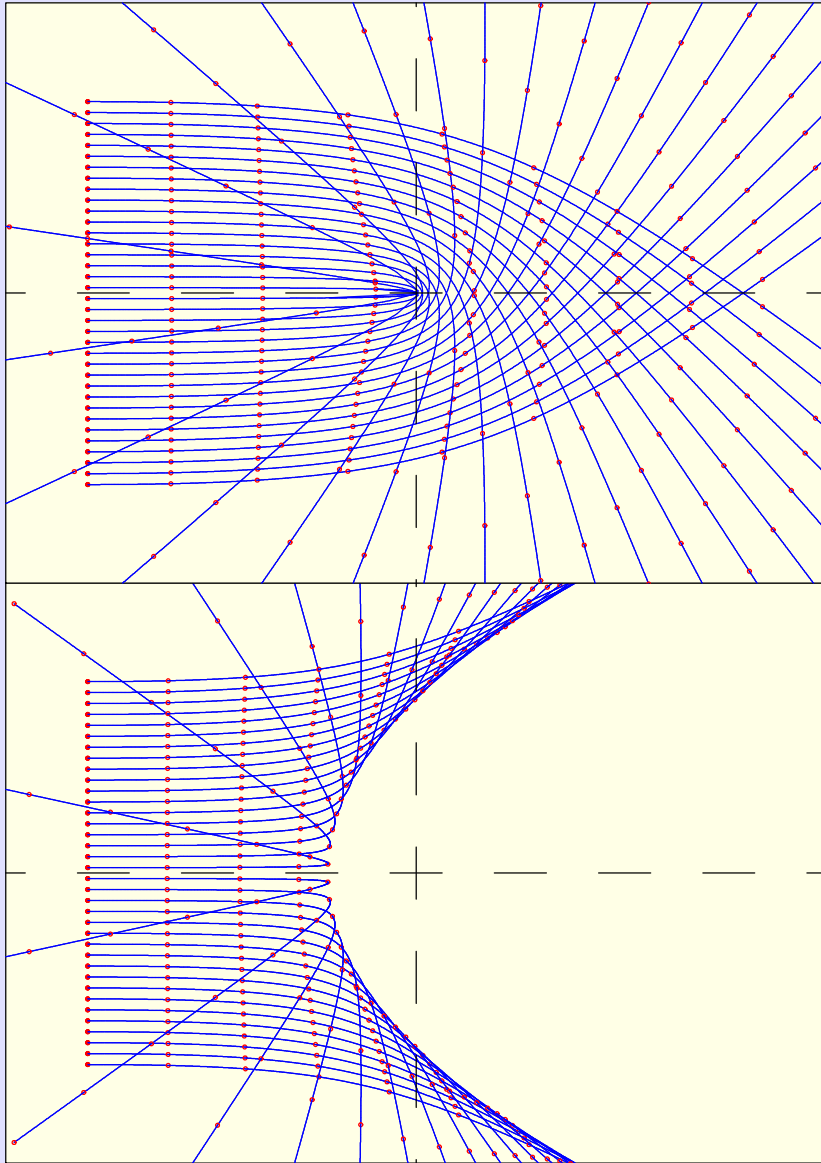


Fig. 16.9. Classical trajectories in an attractive Coulomb potential (top) and in a repulsive Coulomb potential (bottom). The individual trajectories beginning on the far left and containing marks corresponding to equal time intervals differ only by their impact parameter.

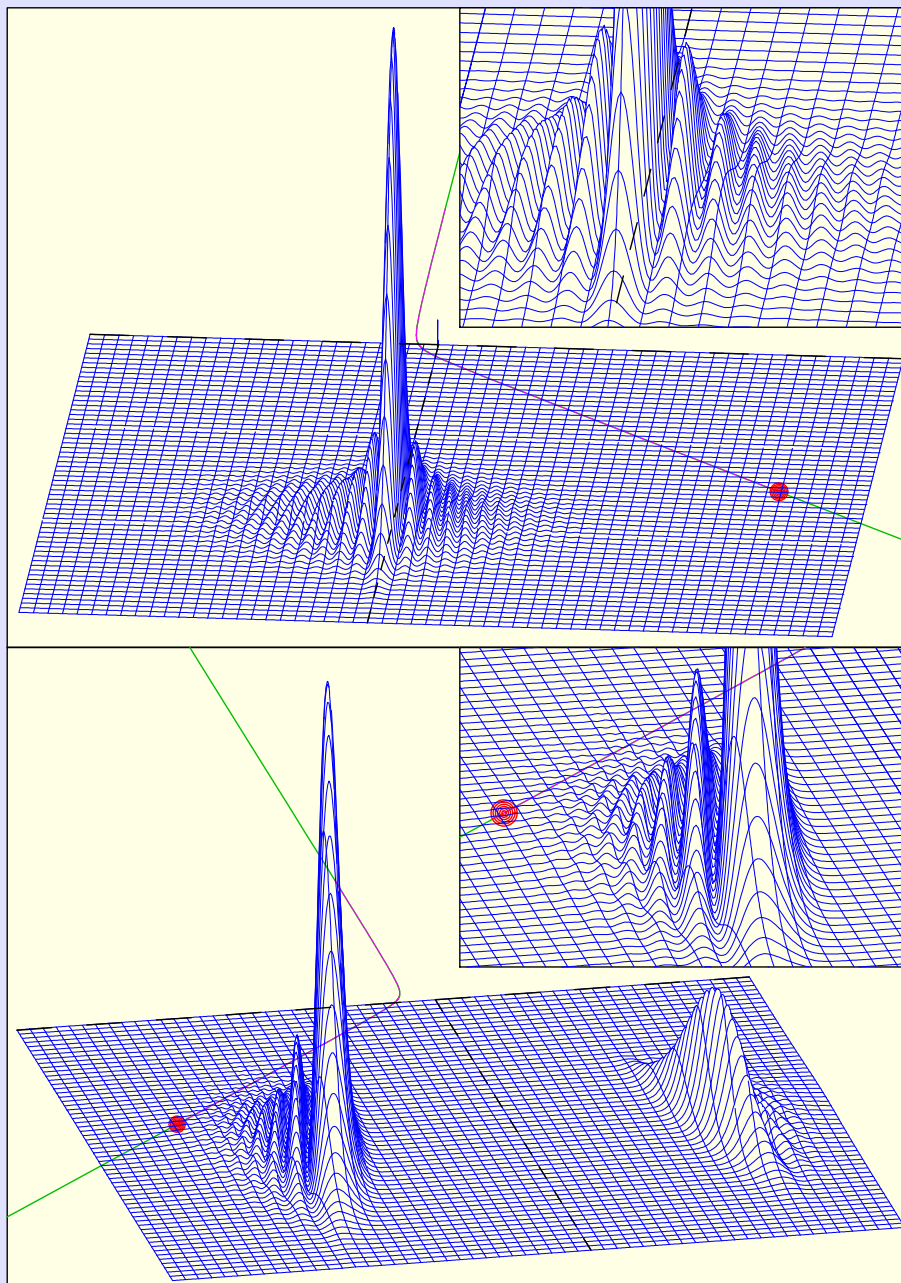


Fig. 16.10. Scattering of a wave packet by an attractive potential (top) and by a repulsive potential (bottom). All physics parameters of the wave packet are the same as in Figure 16.7 and Figure 16.8, respectively, except for the initial spatial width which is 2.5 times higher, and the momentum width which is 2.5 times lower.