

Sphärischer Potentialtopf

$$V(r) = \begin{cases} V_0 & : 0 \leq r \leq a \\ 0 & : \text{sonst} \end{cases}$$

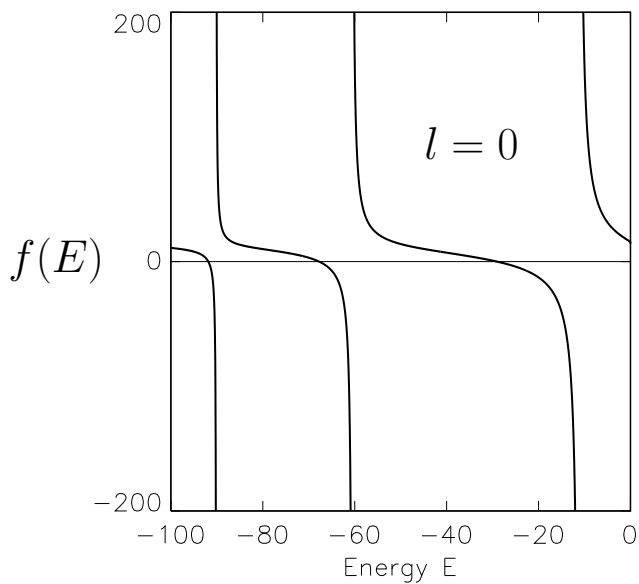
Gebundene Zustände

Lösung der Gleichung

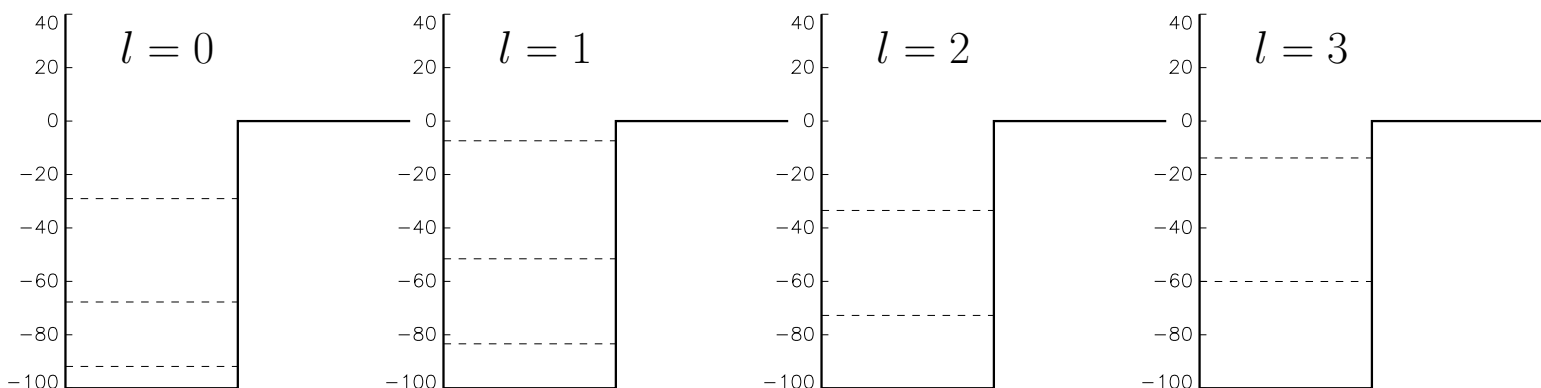
$$f(E) = q \frac{j_l'(qa)}{j_l(qa)} - ik \frac{h_l^{(1)'}(ika)}{h_l^{(1)}(ika)} = 0$$

mit $q = \sqrt{\frac{2m}{\hbar}(E - V_0)}$ und $k = \sqrt{\frac{2m}{\hbar}(-E)}$

(V_0 und E in Einheiten von $\frac{\hbar^2}{2m}$) $V_0 = -100$ $a = 1$

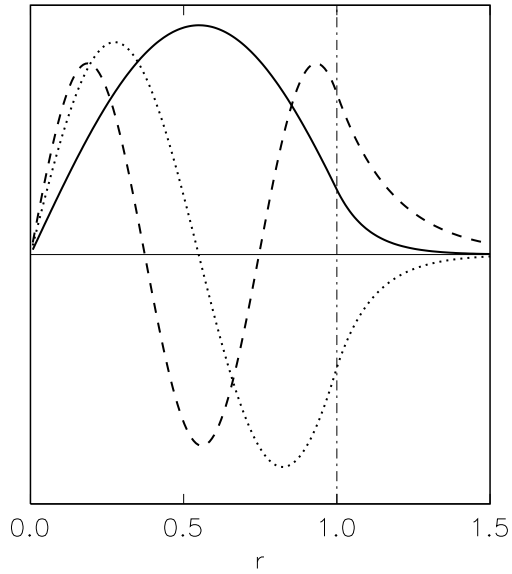


Energieniveaus für verschiedene l

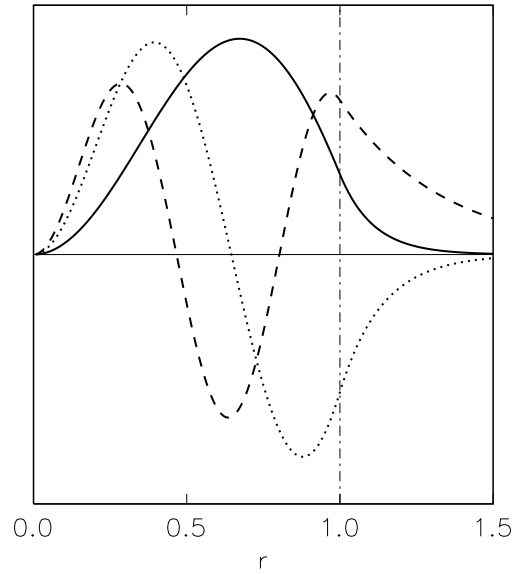


Wellenfunktionen (für den Topf mit $V_0 = -100$)

$l = 0$

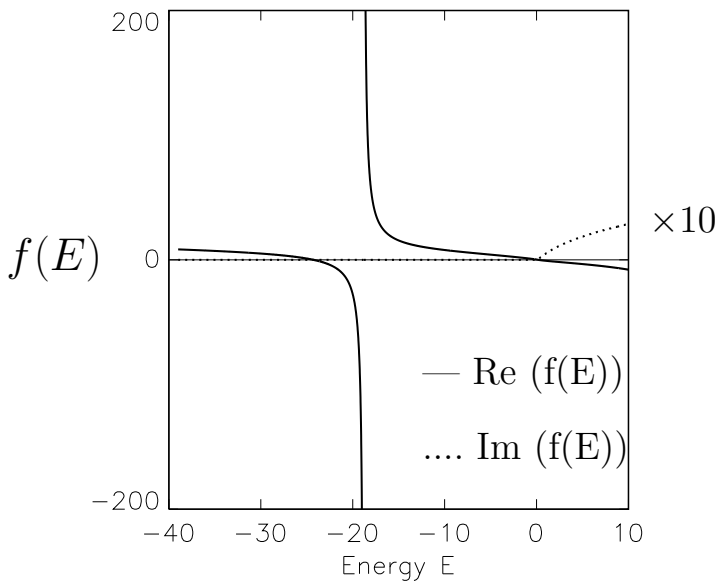


$l = 1$



Resonanzstreuung im Topf mit $V_0 = -39$ und $l = 1$

$l = 1$



$$\text{Re}(f(-24.27)) = 0$$

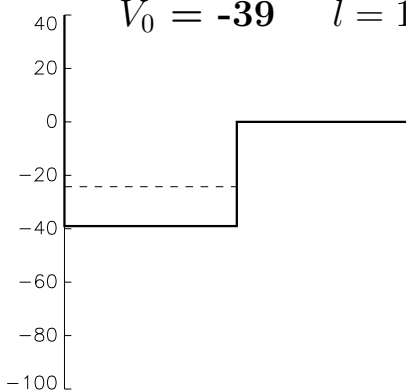
$$\text{Im}(f(-24.27)) = 0$$

$$\text{Re}(f(0.18)) = 0$$

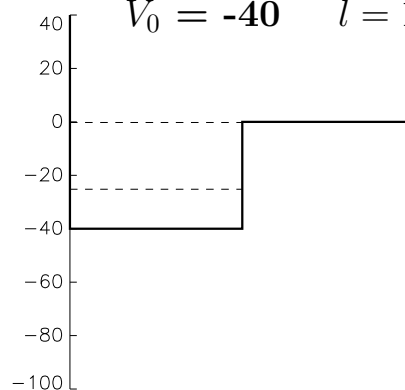
$$\text{Im}(f(0.18)) \neq 0$$

Energieniveaus

$V_0 = -39$ $l = 1$



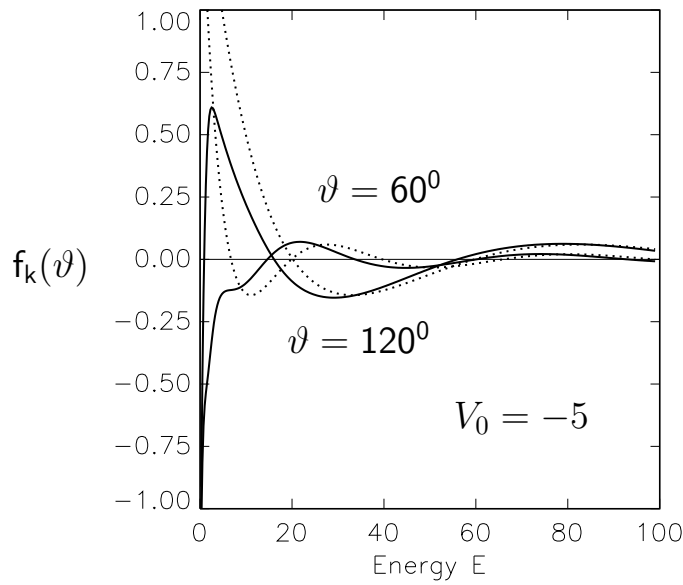
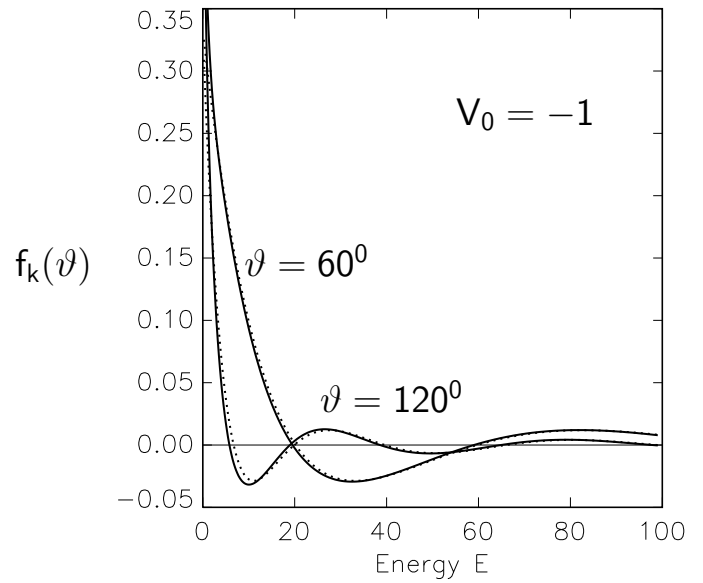
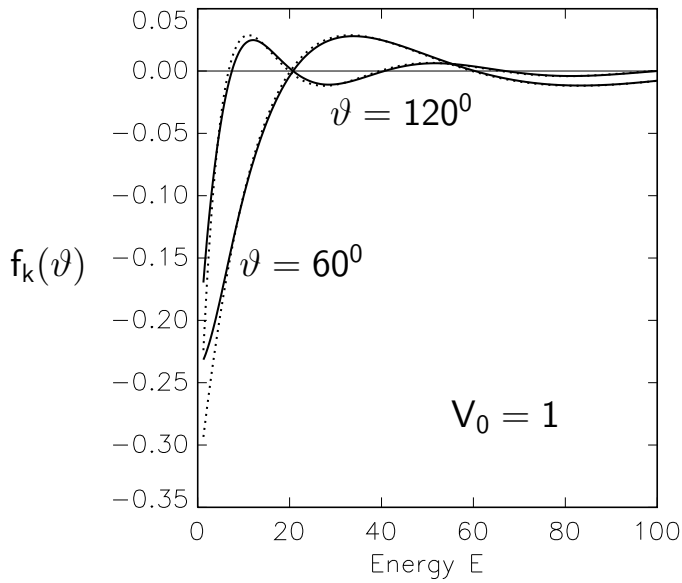
$V_0 = -40$ $l = 1$



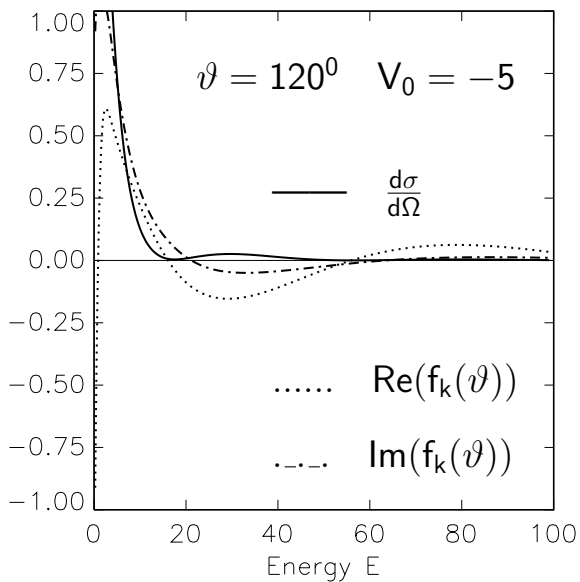
Sphärischer Potentialtopf $(V_0 \text{ und } E \text{ in Einheiten von } \frac{\hbar^2}{2m})$

Streuamplitude:

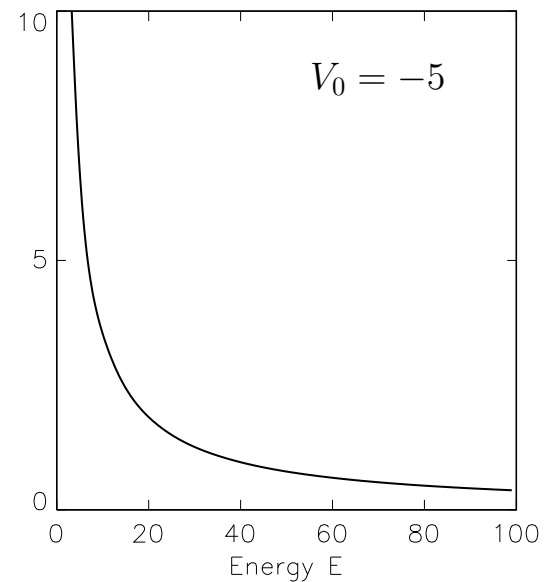
exakte Lösung (—) im Vergleich mit erster Bornscher Näherung (.....)



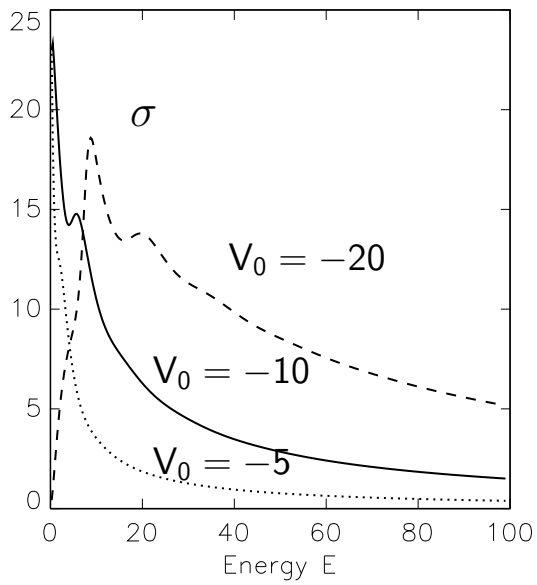
Diff. Wirkungsquerschnitt



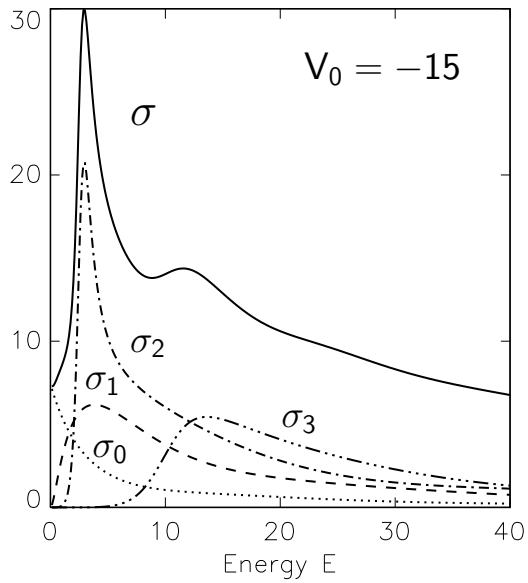
Totaler Wirkungsquerschnitt



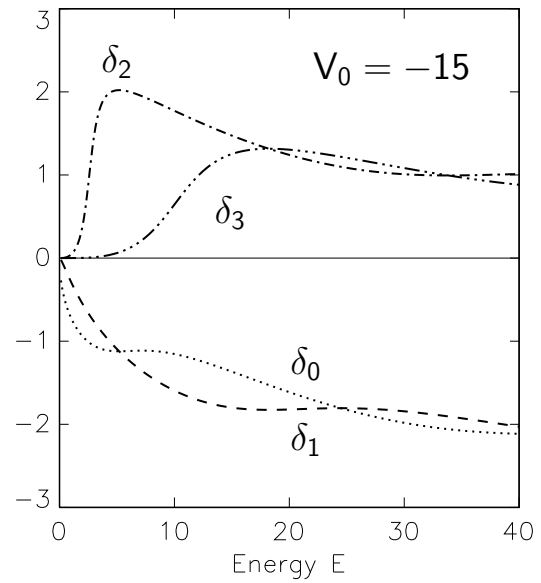
Streuquerschnitt in Abhängigkeit von V_0



Partialwellenerlegung



Phasenverschiebung



Resonanzstreuung

