Problem 27. *–Step potential*

Consider a one dimensional potential $V = \begin{cases} 0 & , \quad z < 0 \\ V_0 & , \quad z \geq 0 \end{cases}$ with a plane wave coming in from the left, with energy E, $E^2 = m_0^2 c^4 + p^2 c^2$. Find the flux density of the reflected and "transmitted" part of the wave in case of a potential $V_0 > E + m_0 c^2 > 2 m_0 c^2$.

Problem 28. *–Well potential*

Consider a potential $V = \begin{cases} 0 & , \quad |x| < \frac{a}{2} \\ V_0 & , \quad |x| \geq \frac{a}{2} \end{cases}$. Discuss the spectrum of $\hat{H}$ qualitatively for

(a) $|V_0| > 2 m_0 c^2$

(b) in case of $\hat{H} = \vec{\alpha}\vec{p} + \beta m_0 c^2 + \beta V$