Derive the scattering cross section

\[ \sigma(\theta) = \left( \frac{\kappa}{4E} \right)^2 \frac{1}{\sin^4(\theta/2)}, \quad \kappa = \frac{ZZ'e^2}{4\pi\epsilon_0} \]

for elastic scattering of particles with electric charge \( Ze \) and energy \( E \) from stationary atomic nuclei with charge \( Z'e \). Note that \( \sigma(\theta) \) does not depend on whether the beam is positively or negatively charged.

Solution: