Let E_1 be the outgoing energy of the incident particle after scattering. According to equation (3-117') of Goldstein, it is given by the relation

$$E_1(\Omega) = E_0 (1+\rho)^{-2} (1 + 2\rho\cos\Theta + \rho^2). \quad (3\text{-}117')$$

It lies within the range (E_1^{min}, E_1^{max})

with $E_1^{max} = E_0$ and $E_1^{min} = E_0 \dfrac{(1-\rho)^2}{(1+\rho)^2}$.

Let ΔN be the number of incident particles scattered into the energy interval $(E, E+\Delta E)$.

Then, using χ, one has the relation

$$\Delta N = \text{const} \int_{4\pi} \chi(E_1(\Omega); E, \Delta E)\, \sigma(\Omega)\, d\Omega$$

Also, since $\sigma(\Omega) = \text{const}$, and