The total number of collisions in the material thickness *t*:

$$\Omega_0 = \frac{6680t}{\beta^2} \frac{(Z + 1)Z^{\frac{1}{3}}z^2}{A\left(1 + 3.34\left(\frac{\alpha zZ}{\beta}\right)^2\right)}$$

$\beta = v/c$, v the velocity of the scattered particle of charge z , Z the atomic number, A the atomic weight, α the fine structure constant.