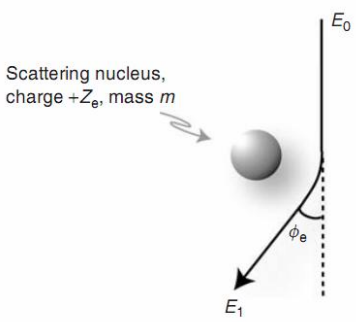
Primary electron make <u>random</u> elastic and inelastic collision either it loses all of its energy (thermalisation), or reachs the boundary of sample and emitted as a backscattered electrons (BSE).

The probability that a primary electron will interact with an atom is known as its cross-section ó, while the expression for the (Rutherford) elastic scattering cross-section $ó_e$, given as,



$$\sigma_e(> \phi_0) = 1.62 \times 10^{-20}(Z^2/E^2)\cot^2(\Phi_0/2)$$

where $ö_0$ is a given scattering angle, in radians, and $ó_e$ ($>ö_0$) denotes the probability of scattering an electron to angles larger than $ö_0$. Note that E = E_0, in kV. It can be used to predict the distance that an electron will travel before encountering an elastic collision (elastic mean free path ëe).

<u>Monte Carlo simulation</u>

A computation method depends on random sampling to compute the result (i.e. just a repeat computation to use a random number, to get probability distribution). A very useful and widely-used modeling technique (e.g. risk in business)….

Here it can be used to predict the range of primary electrons as they interact with a sample…