Then a charge particle passes through a medium its path will not in general be straight but will continually be deviated because of the frequent coulomb interactions between its electric field and that of the atomic nuclei near its line of motion. The mean angular deviation of a particle of a charge 'z' in a length 't' is given by

\[ \langle \phi \rangle = \frac{k_z t^{1/2}}{p \beta} \]

where \( k_z \) = \( \frac{Z}{e} \), \( \beta \) = constant for a given cell length 't', \( \beta \) = momentum of the particle and \( \beta = \frac{V}{c} \) ratio of its velocity to that of the light. \( \phi \) is expressed in degrees, and 't' is in cm. It is customary to change \( \langle \phi \rangle \) obtained by conveniently chosen value of 't' to the equivalent value for a standard cell size \( t = 100 \mu \). This value is referred to as \( \alpha \) in degrees.

\[ \alpha_{100} = \frac{k_z (100)^{1/2}}{p \beta} = \frac{k_z}{p \beta} \]

where 'k' is called the scattering constant and varies slowly in between...
26 and 30 depending upon cell size and velocity of the particle.

Now, \( \langle \hat{\phi} \rangle = \frac{k z x^{1/2}}{p \beta} = \frac{k z x^{1/2}}{p \beta 10} = \lambda_{100} \frac{x^{1/2}}{10} \)

Again, the 2nd difference \( \ddot{S} \) in making measurements by the co-ordinate methods are related as follows to the average angular deviations \( \langle \hat{\phi} \rangle \). The first differences \( S_1, S_2, \) etc., between successive values of the intercepts of the track with the scale which is perpendicular to the stree motion that is kept along the track with the scale \( Y_1, Y_2 \) etc using a given cell size 't' give the inclination of the chords \( f_1, f_2 \) etc.

So, \( S_1 = Y_2 - Y_1 = C f_1 \). The 2nd differences \( \Gamma_1, \Gamma_2 \) etc give the successive deviations between chords.

\( \Gamma_1 = S_2 - S_1 = C(f_1 - f_2) = t \langle \hat{\phi} \rangle \)

Since,
\( \langle \hat{\phi} \rangle = \frac{x^{1/2}}{\alpha} \), \( \frac{\partial}{\partial x} = \langle \hat{\phi} \rangle \), \( \text{So, } \alpha = \frac{x^{1/2}}{D} \)

Now, \( \frac{\frac{x}{L}}{L_{100}} = \left( \frac{x}{100} \right)^{1/2} \)
\[
\frac{L_t}{N_{pp}} \cdot \left( \frac{t}{100} \right)^{1/2} \quad \text{or} \quad \frac{p_f}{L_t} = k \cdot \left( \frac{t}{100} \right)^{1/2}
\]

i.e. \( p_f = \frac{k Z}{L_t} \cdot \left( \frac{t}{100} \right)^{1/2} = \frac{k^2}{L_t} \cdot \frac{t}{10} = \frac{k}{e^74} \cdot t^{3/2} \)

i.e. \( p_f = \frac{k}{e^74} \cdot \frac{t^{3/2}}{D_t} \quad \text{mEV/e} \)