MONTE CARLO SIMULATION
3D Simulation.

QUESTION:

Point source is anisotropic: all electrons are emitted along one direction; electron-atom scattering is anisotropic: Theta, θ is determined from $\sin(\theta/2) = a_3$, (where a_1, a_2 and a_3 are random numbers selected between 0 and 1)
Determination of λ and φ is given by:
Lambda, $\lambda = -\ln a_1$, phi, $\varphi = 2\pi a_2$.
It is necessary to make simulation for the anisotropic case and to compare results with previous results for isotropic case.
Lambda is the length between the collisions, phi and theta are the angular displacement in x-y, x-z coordinates respectively.

From the sine identity formula, we have that:

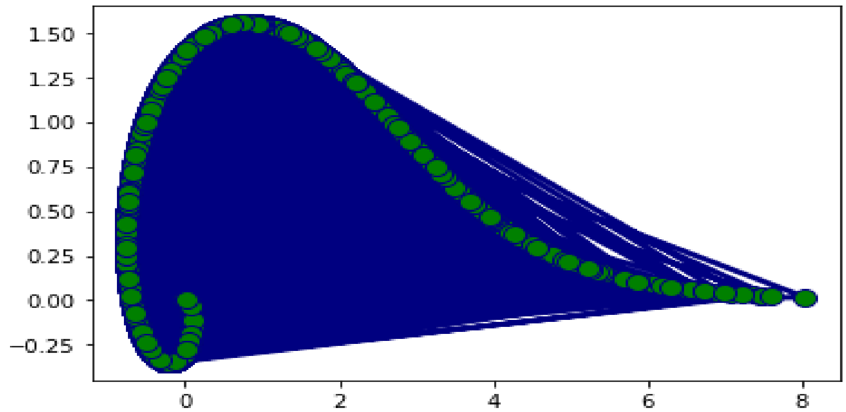
$$\sin(\theta/2) = \sqrt{\frac{(1-\cos\theta)}{2}} = a_3$$

$$\frac{(1-\cos\theta)}{2} = a_3$$

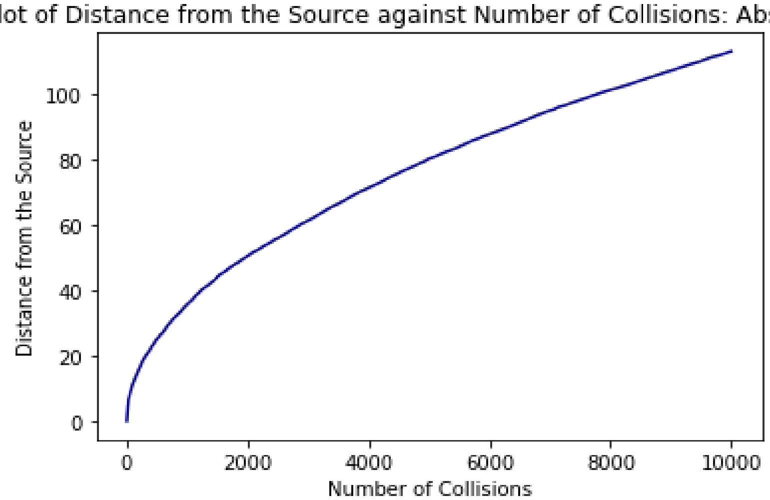
$$\cos\theta = 1 - 2a_3^2$$

$$\theta = \arccos(1 - 2a_3^2)$$

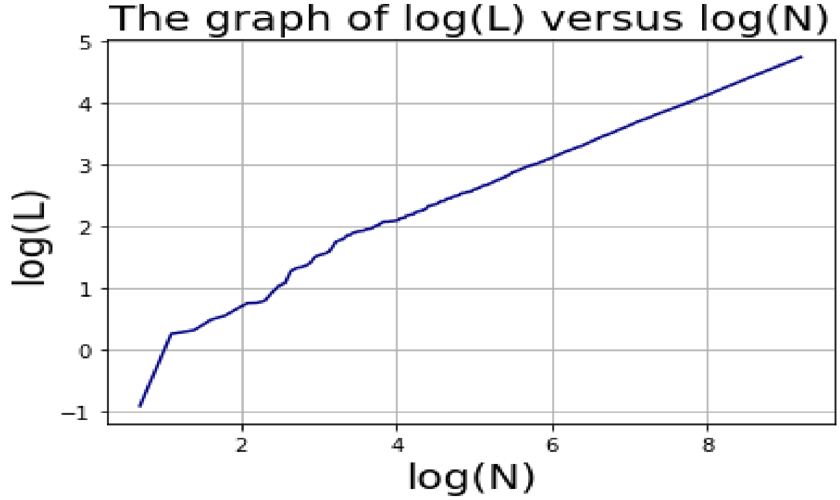
Anisotropic Electron-Atom Scattering in the case of 2D for 10000 collisions



The Plot of Distance from the Source against Number of Collisions: Absolute Values

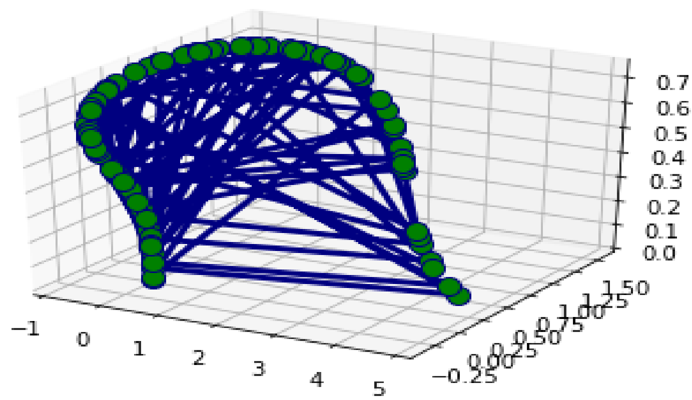


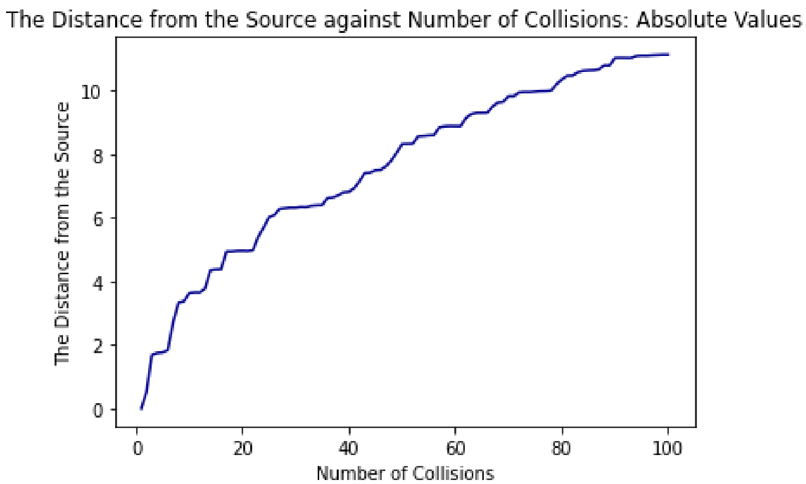
The graph of log(L) versus log(N)

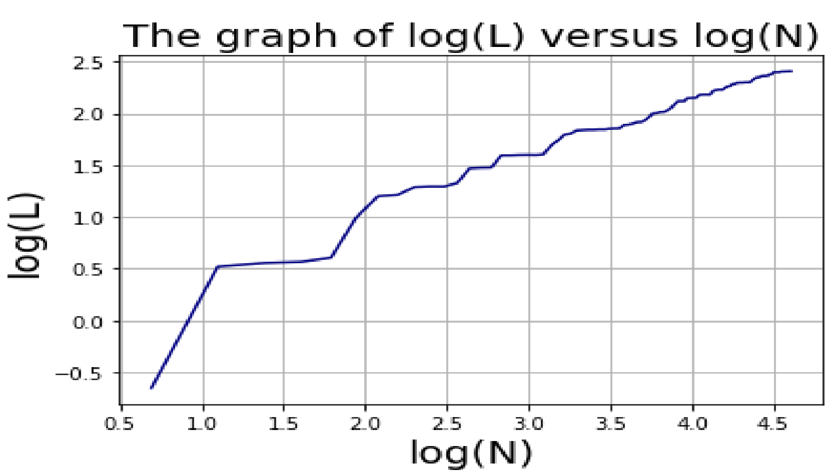


Anisotropic Electron-Atom Scattering in 3D for 100, 1000, and 10000 collisions.

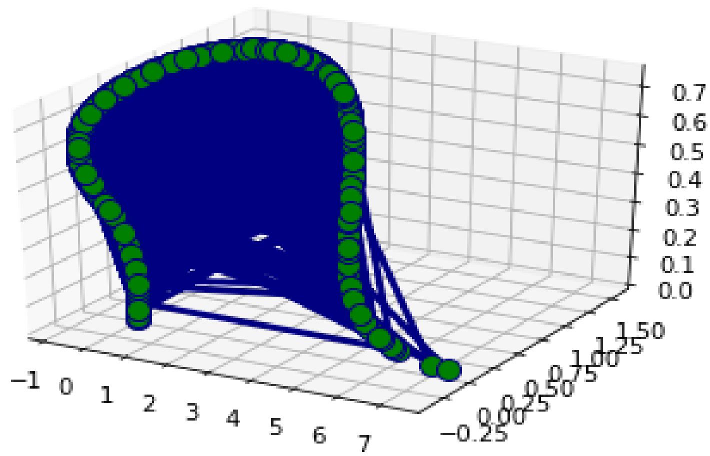
For 100 collisions:

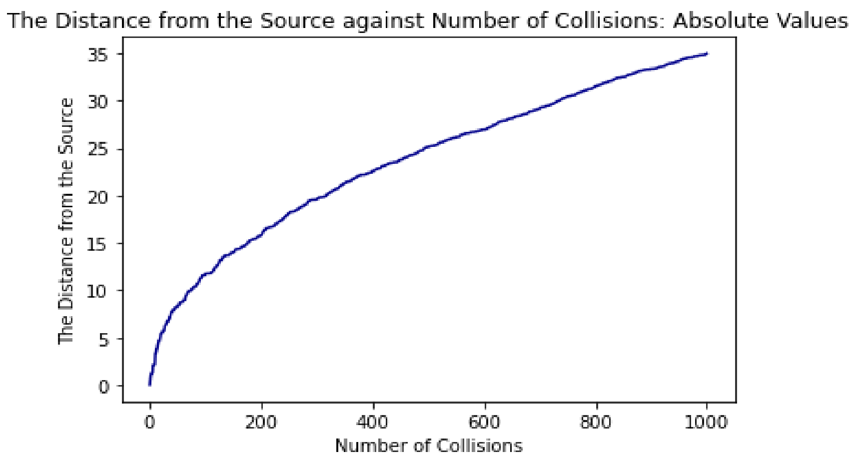


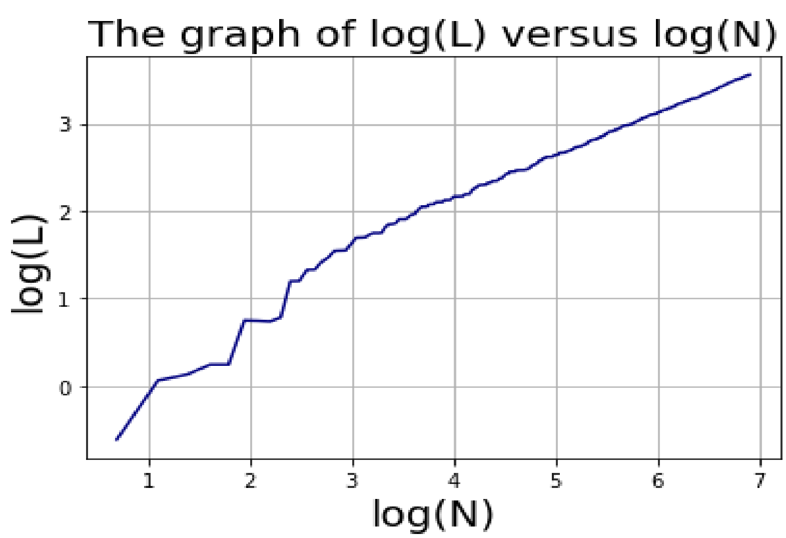




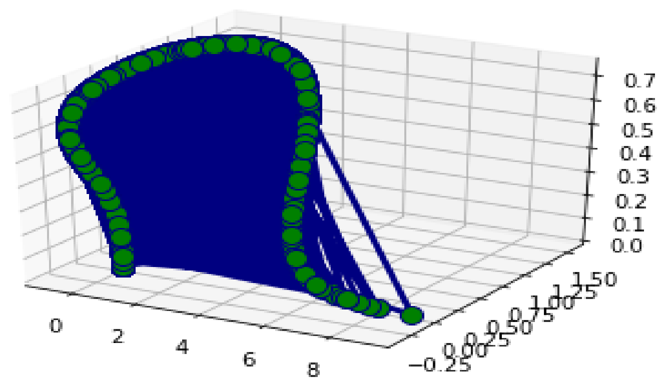
For 1000 collisions:

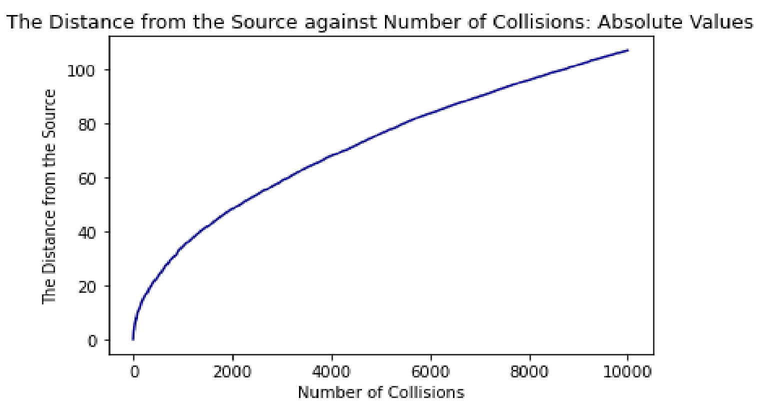


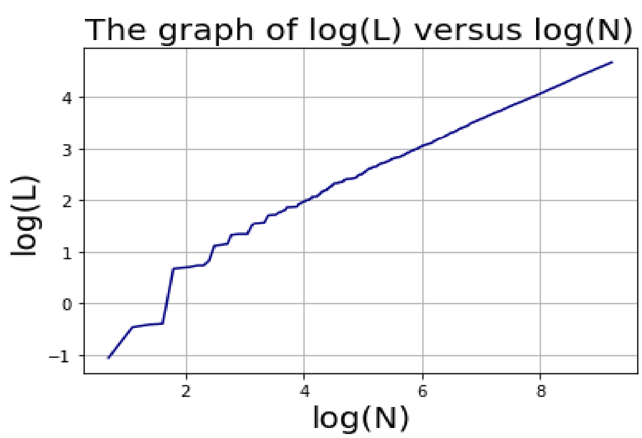




For 10000 collisions:







The codes for these Results can be found in My GitHub

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