Assignment Report – Quiz 2

Optical Tweezers

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About the Assignment

- This assignment describes the motion of a particle in 1D when acted upon by force due to thermal conditions which varies within a certain range.
- This involves solving of a 1st order differential equation which relates acceleration and velocity.

About the program

- This program needs inputs namely Size of particle (D in nanometre), Temperature (T in Kelvin) and Number of Steps(N).
- A force in the range [0,2γK_bT] randomly being generated by randomly generating number between 0 and 1 and is multiplied with 2γK_bT. It is being **randomly assigned sign so now the force lies within ±2γK_bT.**
- The first order differential equation is **solved using RK45 method** which is relatively better.
- The data is generated which corresponds to the values that satisfy the differential equation and it is plotted.
- Two plots, one b(t) vs t and the other RMS distance vs Temperature are given below for a N=10000, D=1000nm, T_i = 300 K and T_f = 600 K.
- NOTE: Every plot generated will be different.