

We discussed the problem of rectification of Brownian motion in the presence of a magnetic field. In the case of underdamped Brownian motion with noise intensity obeying the fluctuation dissipation theorem, no rectification is observed even in the presence of asymmetric boundary conditions. With coloured noise, rectification is possible. Yet the fact that detailed balance does not hold even with white noise (that is, one needs to also invert the field to get the traditional detailed balance expression result), suggests that rectification may be possible. The fact that it is not observed in the present simulations may be due to the size and geometry of the system. We will investigate in future simulations whether rectification happens in another geometry, namely of two concentric annular rings of radius compared to the radius of cyclotron motion. We also started to perform the calculations for the retro-action of a charged Brownian particle on a spin producing a magnetic field. We expect that the equilibrium state will correspond to a zero net magnetic field.

Finally, I gave a talk entitled : Entropy : an obsession ?