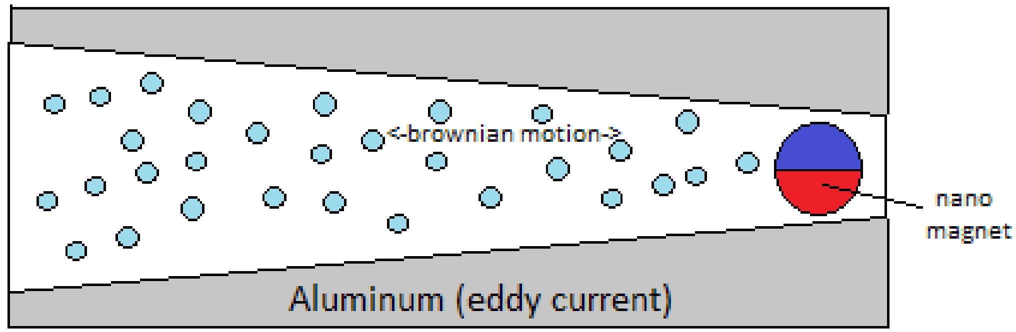
Putting Order into Brownian Motion via a V-Shaped Aluminum Eddy Current Device



A nano magnet vibrates due to brownian motion in a fluid such as water. If this nano magnet is placed into a device with aluminum in it, the nano magnet will interact with the aluminum and cause eddy currents. In this device shown above the aluminum is shaped in a sideways V. The narrower gap causes more eddy current braking or dampening to occur.

Does this device geometry cause the nano magnet to head to the path of least resistance over time, putting direction into brownian motion? The widest gap area should be the least path of resistance. Does the nano magnet migrate toward the wide gap over time? If so, this puts into question the second law of thermodynamics, as brownian motion now becomes directed at our whim, without expending energy.

To reset the system the V-shape could simply be reversed to have the magnet move back to its starting position. Controlling the aluminum v-shape to reset the system is not discussed here as this is another engineering problem to be solved. Even if the brownian motion was ordered once only for many seconds, without continually reshaping the aluminum to reset the system for many minutes, this would falsify the second law as ordered motion would be possible for many seconds during the short brownian motion path. The Vee shape could be extended to be longer too – the diagram shown above is only a sample with a short path.

Interesting questions to ask: what happens when Johnson/Nyquist noise occurs in the aluminum? Does the Johnson noise cause the nano magnet to do nothing spectacular and simply move no where specific with no least path of resistance? Ultimately this would have to be tested empirically to see what the outcome is. How narrow can the gap be for what length so that the path is longer while still noticing the effect?