Magnetic Mirror Effect in Magnetron Plasma:

Modeling of Plasma Parameters

January 24, 2022

1. Control on Particle Update strategies - NOT a control knob

Not really a control knob. Concerns precision of solution / update.

Update strategies used in **particle.ipynb**

Describe the Boris algorithm update strategy.

2. Control of Electric and Magnetic fields - Control Knobs here

Electric and Magnetic field configurations described in **field.ipynb**
Describe the Helmholtz coil magnetic field and electrode potential electric field configurations used.
Different Electric field configurations could be used. Simple example: changing the electrode voltages.
Different Magnetic field configurations could be used. Simple example: using many Helmholtz coils (number controllable), at different angles (angle controllable).

3. Controlling particle initialization - Control knobs here

Sampling particles with different initial velocities, and positions for example using different density functions f. For example: based on parameters like plasma Temperature.
Different particle sampling and initialization strategies used in **sampling.ipynb**

Also track how the velocity distribution changes with time.

References

Qin, H., Zhang, S., Xiao, J., & Tang, W. M. (April, 2013). *Why is Boris algorithm so good?*. Princeton Plasma Physics Laboratory, PPPL-4872.