A First Attempt At The Problem Number Three

Group 3

2021.10

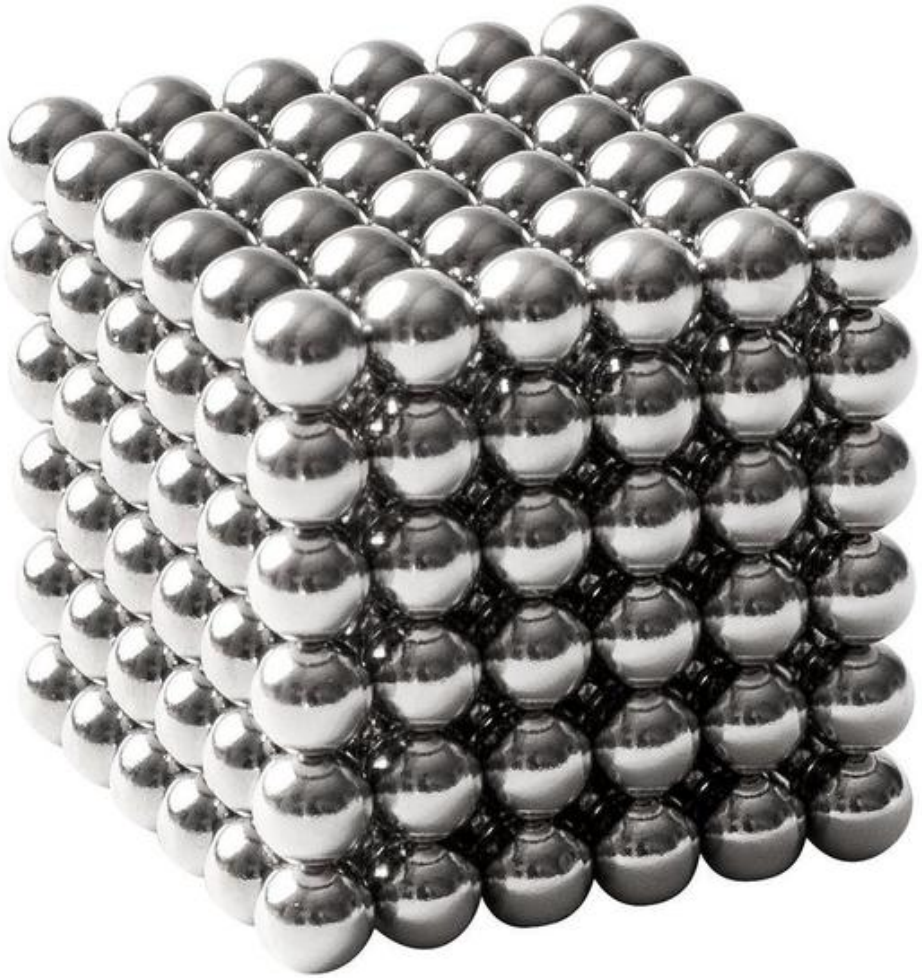
Understanding of the problem

A Magnetic Force Law

One of our first experiences with permanent magnets is that *like poles* repel and *opposite poles* attract. Charles-Augustin de Coulomb tried in vain to develop a simple magnetic force law, much like his electrostatic law, but these attempts ultimately failed since there is no magnetic corollary to charge. That said, for the simple case of spherical magnets one would expect a simple attractive force law.

For this problem you are to measure the attractive force between strong spherical magnets, which are free to rotate, as a function of the distance between their centers. Compare your measurements to the force predicted by classical electrodynamics as we now understand it.

Spherical magnets



Strong spherical magnets

- Not identical!
- More than 2!
- simple→general

Free to rotate

- 1. has angular acceleration
- 2. does not have angular acceleration
- 3. motionless

hypothesis

- The attractive force is inversely proportional to the distance between center of mass
- Analogy of law of universal gravitation and Coulomb Law

Reference

- https://totalelement.com/collections/sphere-magnets
- https://lcmagnet.en.made-in-china.com/product/vNoEOKfXcFhj/China-Strong-N52-Industry-Neodymium-Magnet-Ball-NdFeB-Sphere-Factory.html