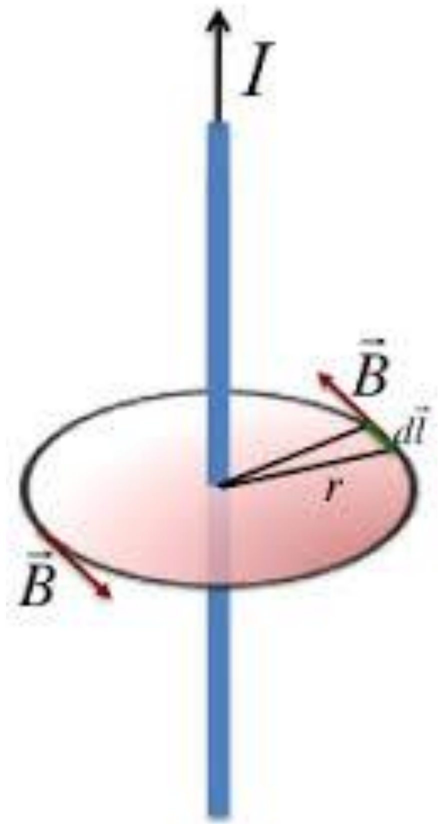
Ampere's Law for Infinite Wire

Consider a straight infinite wire carrying current ***I***. Magnetic field at distance ***r*** from it is:

$$B = \frac{\mu_0 I}{2\pi r}$$

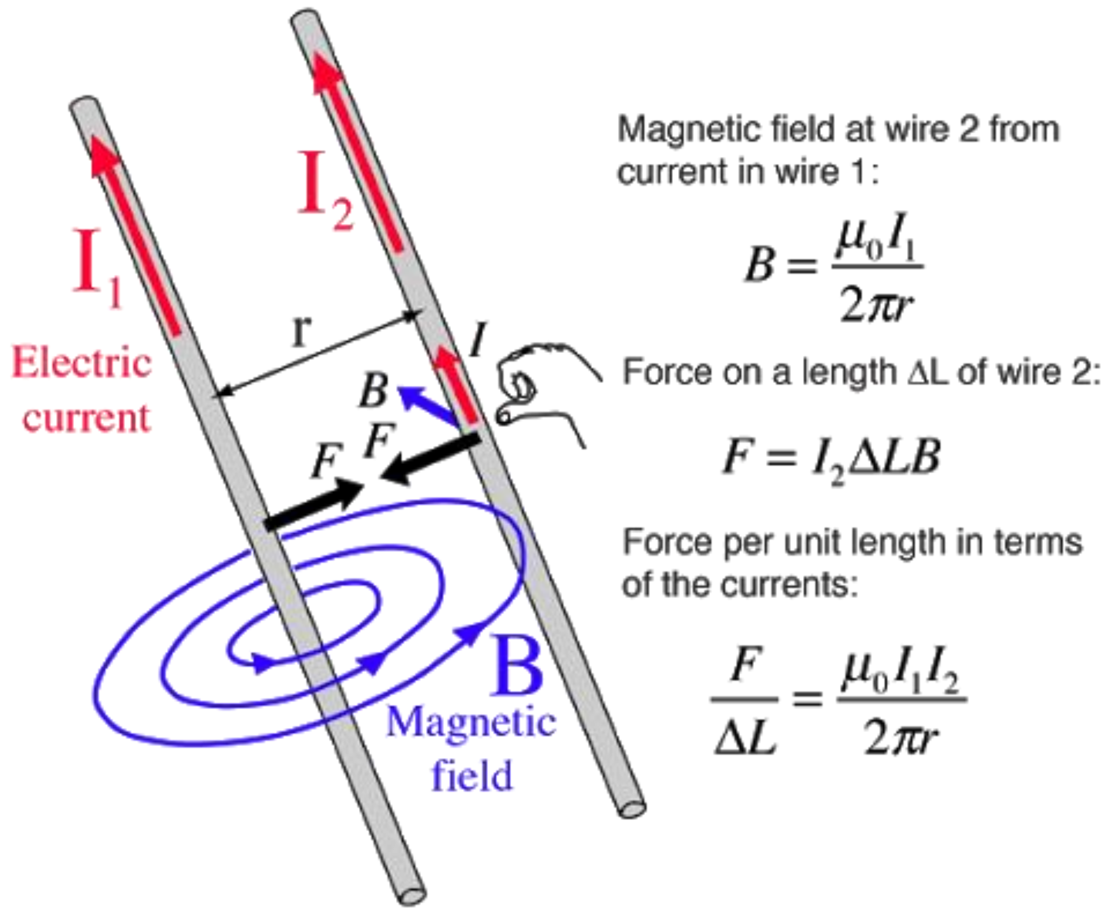


$$\mu_0 = 4\pi \cdot 10^{-7} T \cdot m/A$$

Direction of ***B*** is determined by the right hand rule.

Magnetic Force Between Wires

We combine Ampere's Law with Lorenz Force, ***F=I∆LB:***



Homework

Two parallel wires of radius ***r=0.1 mm*** each, are placed right next to each other (i. e. distance between their centers is 2r). The same current ***I*** is run through each wire. Find the value of ***I***, at which the magnetic force between the wires is equal to the weight of each of them. Density of cupper is ***9000 kg/m³***.