

2. Force between current-carrying conductors

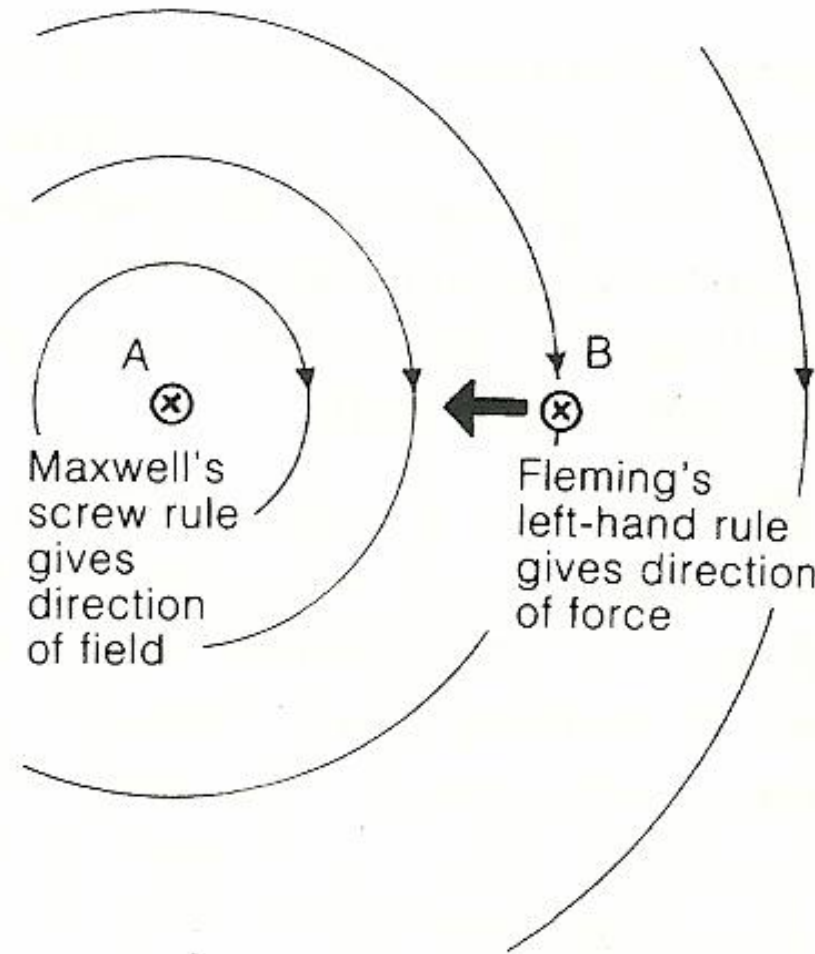


Figure 5 Force between two parallel wires (current going into the page); only the field due to wire A is shown

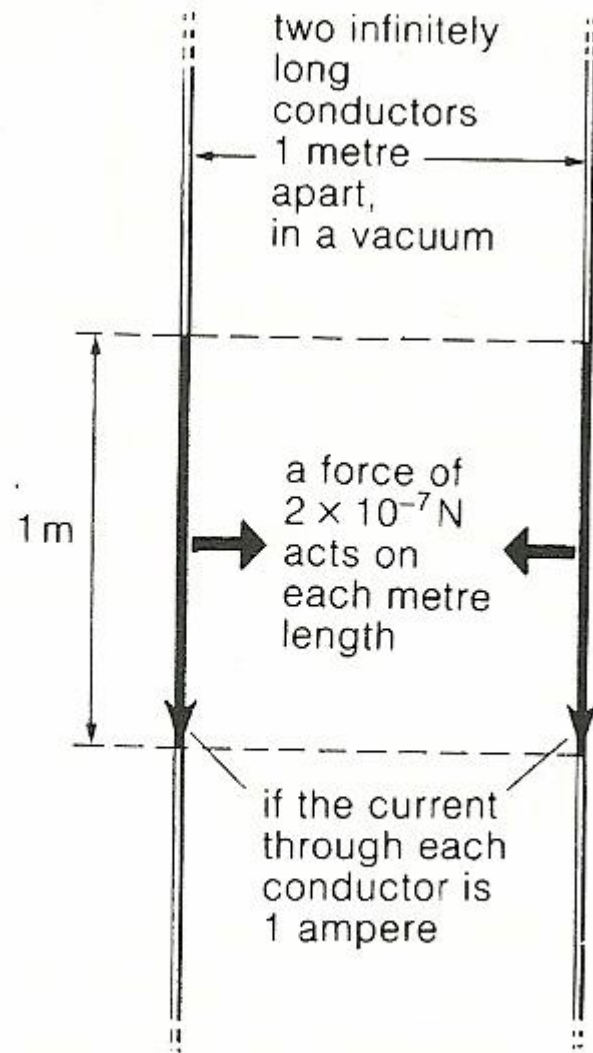


Figure 6 The definition of the ampère

Defining and measuring the ampère:

The ampère is the current which, flowing through two infinitely long, parallel, straight, thin wires placed one metre apart in a vacuum, produces a force of 2×10^{-7} newton on each metre length of wire.

$$F = k (I_1 I_2) l / d$$

F – force (N)

k = $\mu/2\pi$ – constant

L – length of wire (m)

D – distance between wires (m)

μ - permeability

μ_0 – permeability of the vacuum ($4\pi \cdot 10^{-7} \text{ NA}^{-2}$)

μ_r – relative permeability = μ / μ_0

• There is a force of 16N acting on 1 metre of current-carrying wires at a distance from each other of 0.2 m. Relative permeability of the material is almost 1. Calculate current flowing through wires.