Magnetism

Nick Sebasco

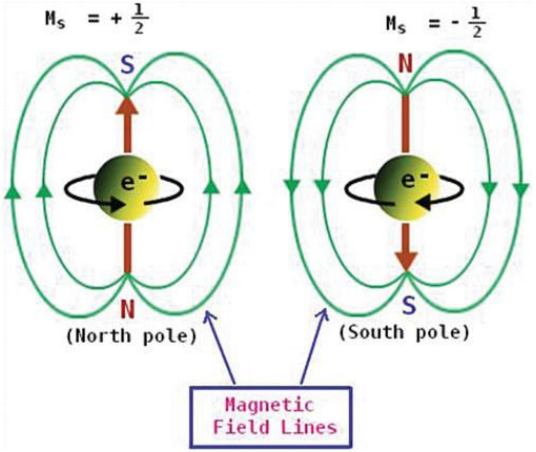
Hidden magnetic field lines stretch millions of light years across the universe.

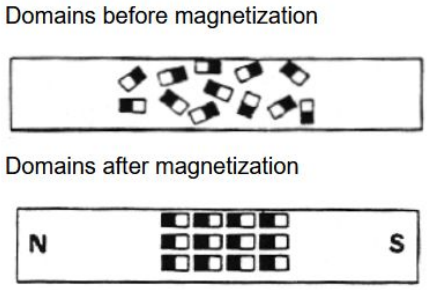
What is a Magnet?

Magnets can be made by placing a magnetic material, such as iron or steel, in a strong magnetic field. Magnetic fields emerge from the moving negative electrical charge of electrons in an atom.

There are three types of magnets:

1. permanent magnets
2. temporary magnets
3. electromagnets





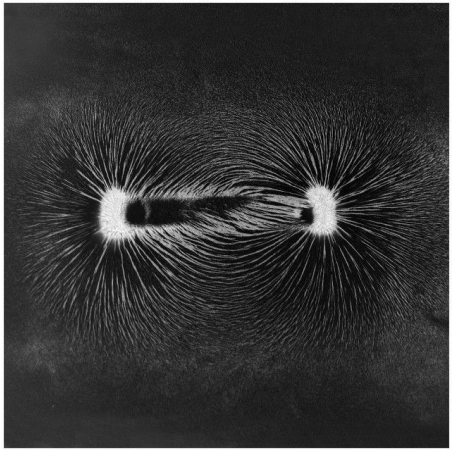
Magnetism

Magnets produce a persistent magnetic field; whereas, a magnetic material only produces a magnetic field when exposed to another magnetic field.

All materials exhibit at least one of the types of magnetism

Types of magnetism:

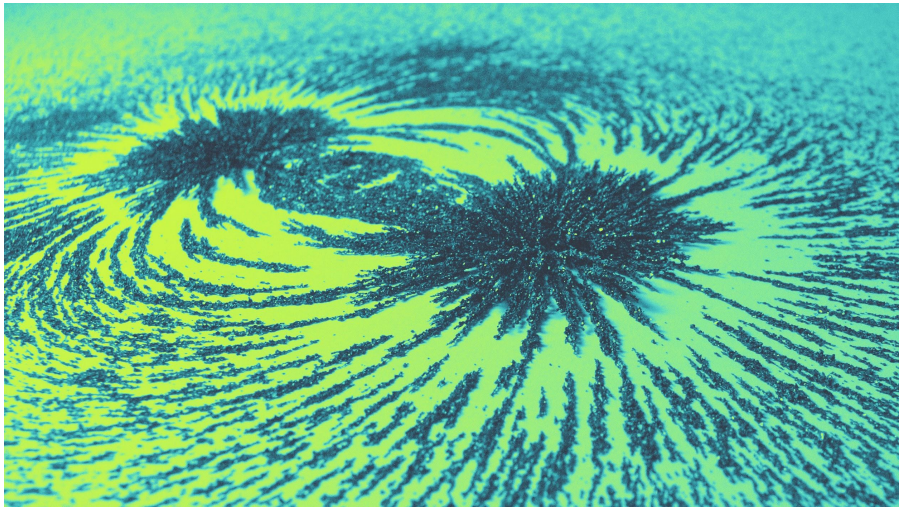
1. Ferromagnetic
2. Paramagnetic
3. Diamagnetic
4. Antiferromagnetic



Magnetic Fields

Every magnet generates a magnetic field, similar to electric charges

Direction of magnetic field - The direction a compass needle would point if immersed in a magnetic field



History of Magnetism

600 BC

Written account of Lodestone

Thales

1540-1603

Earth is a weak magnet

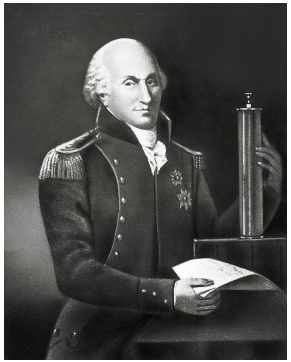
William Gilbert

1736-1803

Inverse Square Law

Charles Coulomb

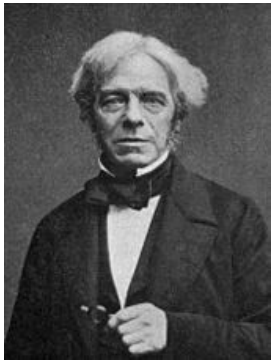
$$F \propto \frac{1}{r^2}$$



1775-1806

Effects of Electricity and Magnetism

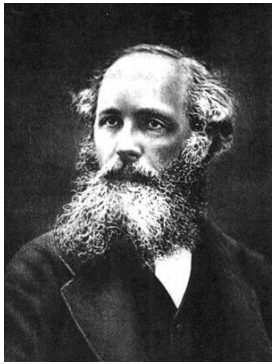
Andre Ampere & Michael Faraday



1831-1879

Unification of Electricity & Magnetism

James Clerk Maxwell



1933-

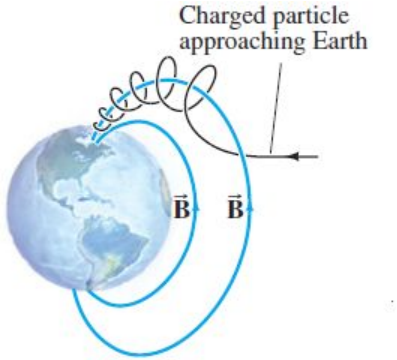
Steven Weinberg

Electromagnetism is part of the electroweak force

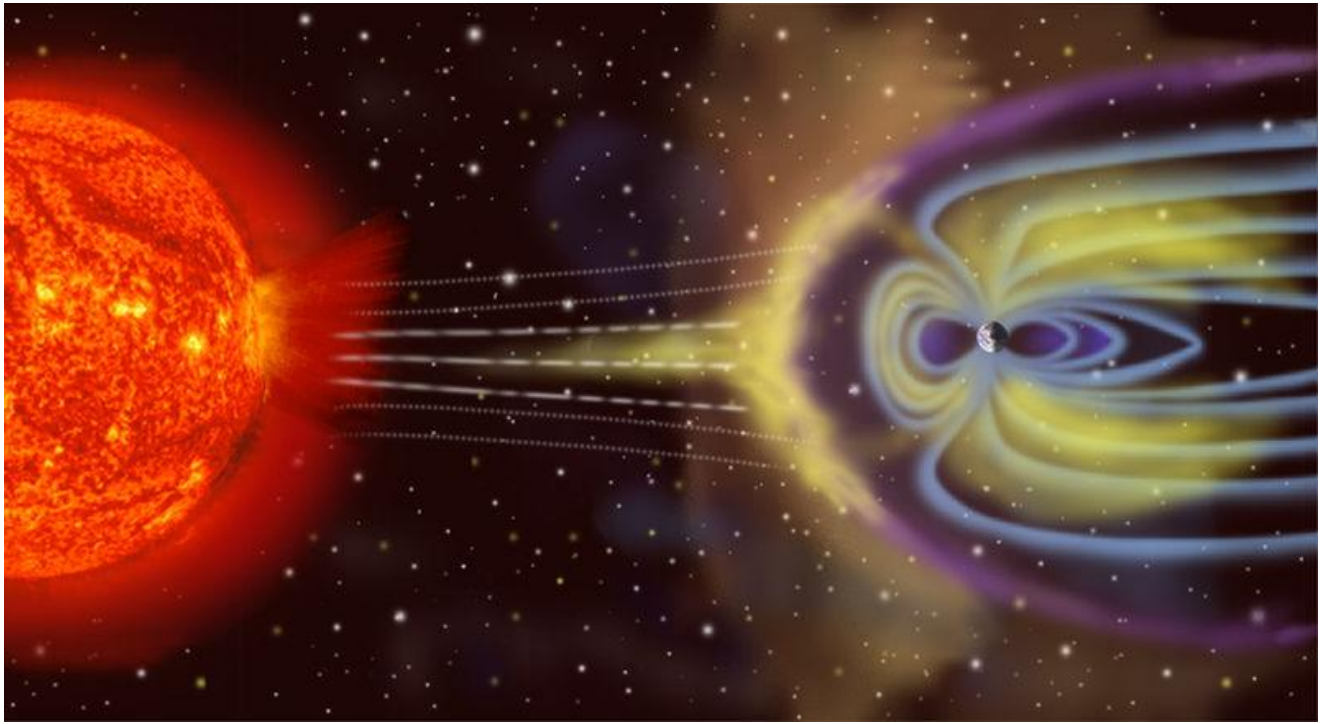
Aurora Borealis

Charged ions approach the Earth from the sun, solar wind.

A high concentration of high-speed charged particles ionizes the air, and as the electrons recombine with atoms, light is emitted.

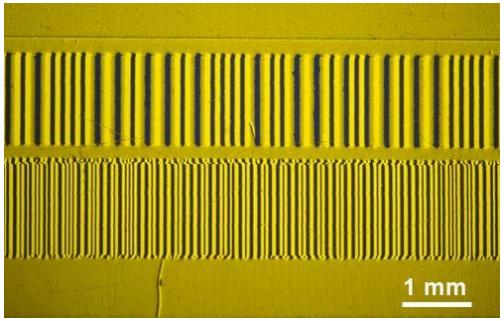


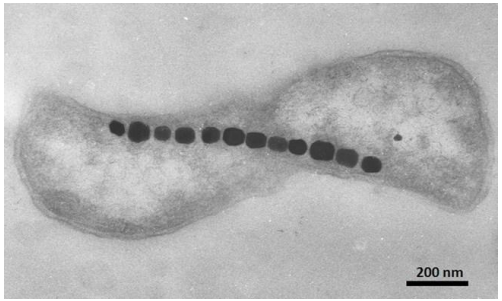
Interaction Between Solar Wind and Magnetosphere



“The average commercial airline pilot receives more radiation exposure than a fuel-cycle worker in a nuclear power plant” - Chris Merten - a senior scientist at NASA's Langley Research Center

Magnets in the Wild





Magnetic Fruit Activity

In your group, work together to get your Kiwi fruit rotating.

The first group to get 5/10 rotations win.

You may only use the following:

- 2 Kiwi’s
- Rope
- Magnets

You have 5 minutes to complete this challenge.

Kahoot!

Magnetism quiz!

Sources

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