

Physics 102

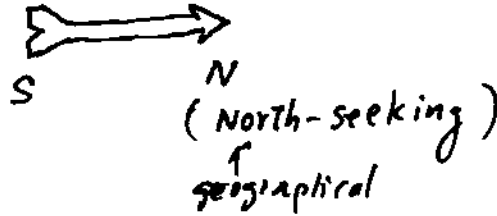
Lecture 14.

• Magnetism

— Magnets always have two poles (No "magnetic charges" ~~are~~ "Monopole")



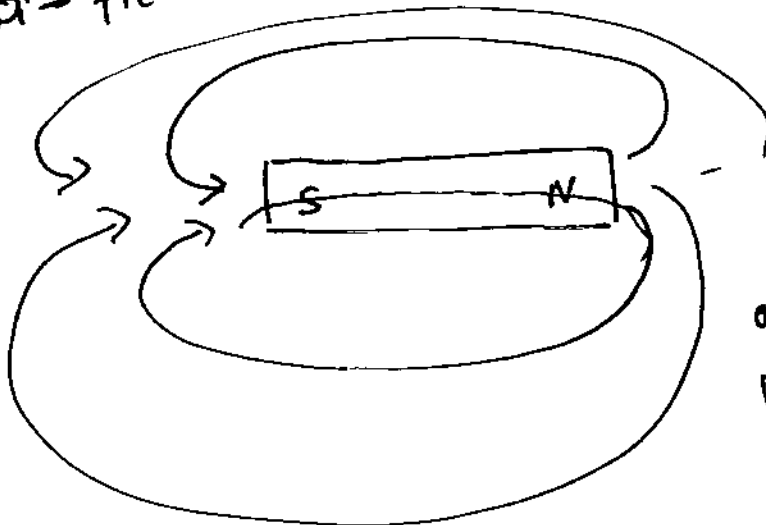
Compass



— Magnetic field \vec{B} .

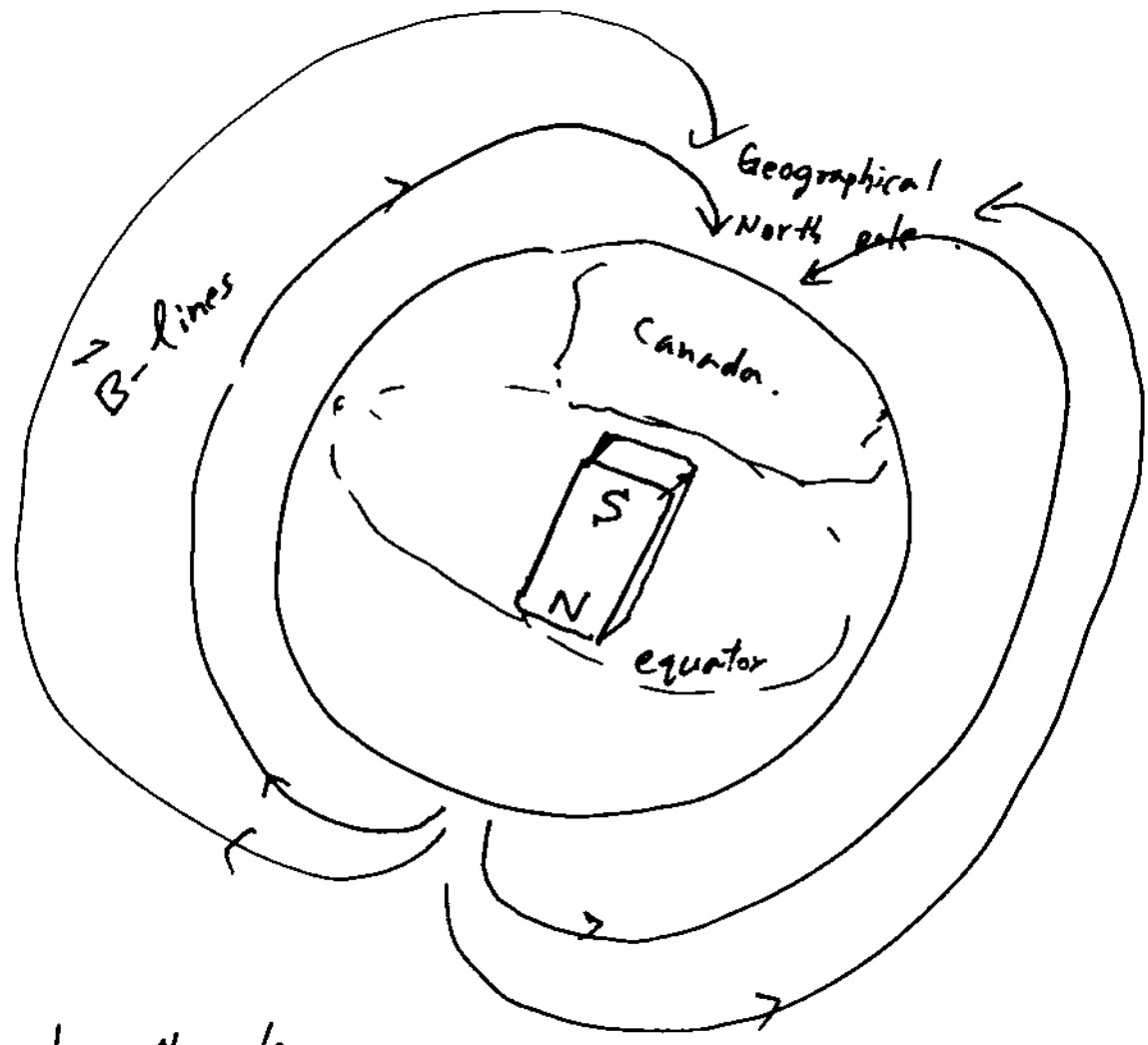
\vec{B} -line : North pole of compass points to \vec{B} .

— \vec{B} -field due to a bar magnet.



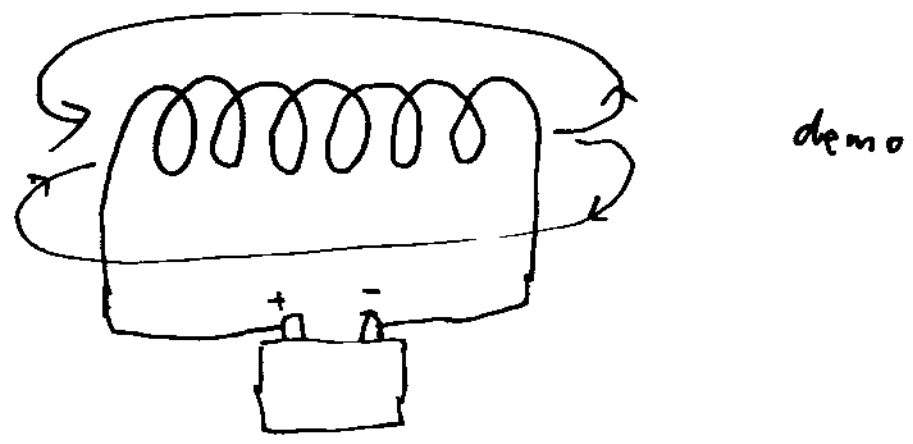
outside : North to south.
inside : South to north

- Magnetic field due to the earth .



The geographical north pole
is near the magnetic south pole .

- Origin of magnetic field : electric current .



- Magnetic force on moving charges .

$$\vec{F} = q \vec{v} \times \vec{B}$$

Right-hand-rule :

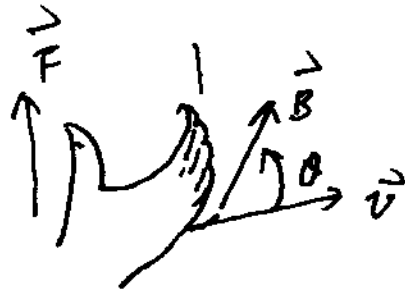
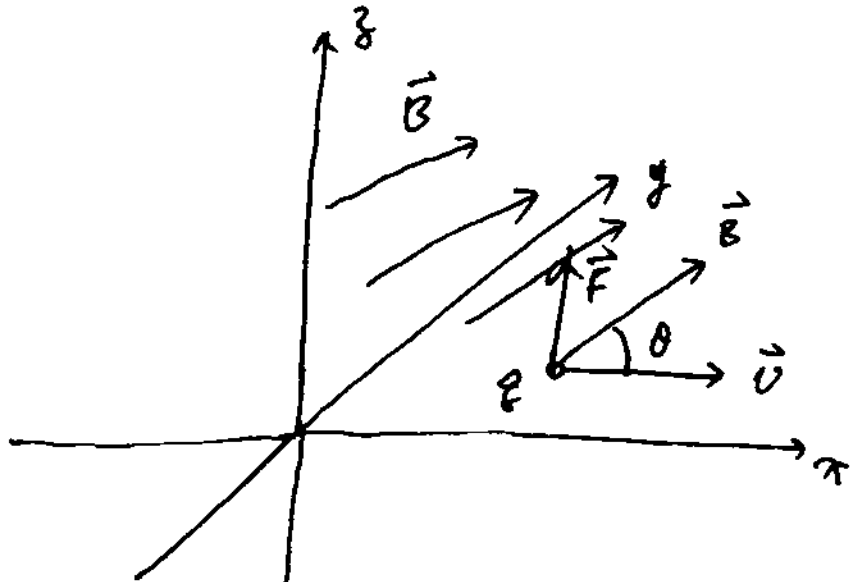
Direction :

$$\vec{F} \perp \vec{v}$$

$$\vec{F} \perp \vec{B}$$

If \vec{B} and \vec{v} are
in x - y plane.

Then, \vec{F} must be in the z (+/-) direction).



Magnitude :

$$F = |q| \cdot B v \cdot \sin \theta$$