

## Diamagnetic

Material does not have permanent magnetic moments

Resultant orbital angular momentum of atoms/molecules:

$$\sum_i L_i = 0$$

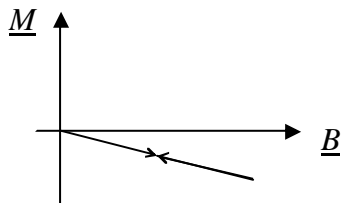
Examples:

Glass Copper

Material is repelled towards field-free regions, but very weakly.

Negative

Weak



$$\underline{M} = N \langle \underline{m} \rangle$$

## Paramagnetic

Atoms & molecules have non-zero angular momentum:

$$\sum_i L_i \neq 0$$

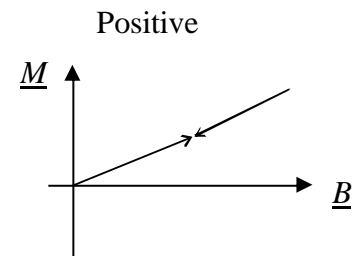
- Permanent magnetic dipole moment

Examples:

Oxygen Titanium

Random orientation when no external magnetic field.

Lines up when external field is applied



Paramagnetism is weak, but slightly stronger than diamagnetism

$$\underline{m} = I \underline{S} \quad \text{units of magnetisation: Am}^{-1}$$