States of Matter

Chemistry
The Four States of Matter

States of Matter

The Four States of Matter

Four States

- Solid
- Liquid
- Gas
- Plasma

States of Matter

The Four States of Matter

Basis of Classification of the Four Types

- Based upon particle arrangement
- Based upon energy of particles
- Based upon distance between particles

States of Matter

Solids

- Particles of solids are tightly packed, vibrating about a fixed position.
- Solids have a definite shape and a definite volume.
- Solids have an infinite number of free surfaces.

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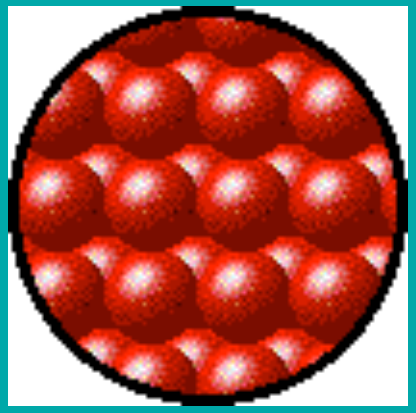
Solids

Particle Movement



Examples

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Liquids

- Particles of liquids are tightly packed, but are far enough apart to slide over one another.
- Liquids have an indefinite shape and a definite volume.
- Liquids have one free surface.

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Liquids

Particle Movement

Examples

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Gases

- Particles of gases are very far apart and move freely.
- Gases have an indefinite shape and an indefinite volume.
- Gases have no free surfaces.

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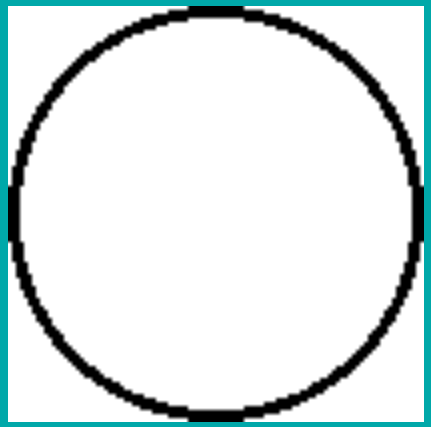
Gases

Particle Movement



Examples

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Plasma

- A plasma is an ionized gas.
- A plasma is a very good conductor of electricity and is affected by magnetic fields.
- Plasma, like gases have an indefinite shape and an indefinite volume.

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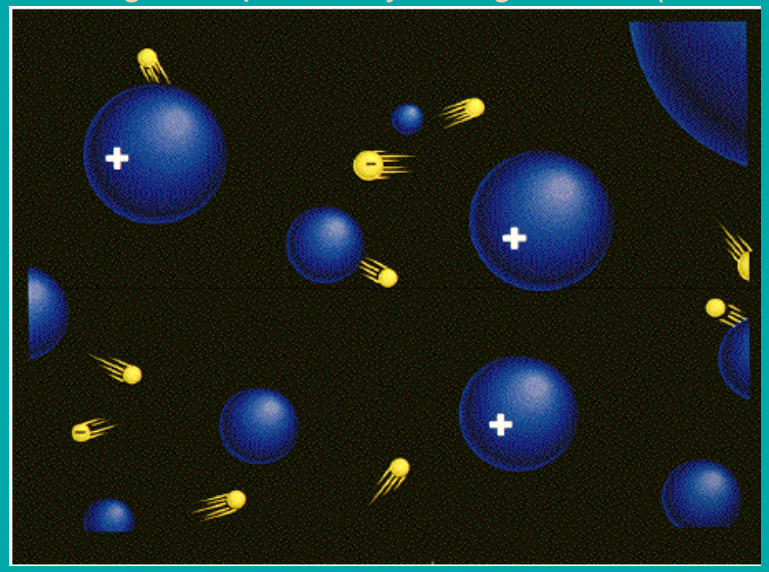
Plasma

Particles

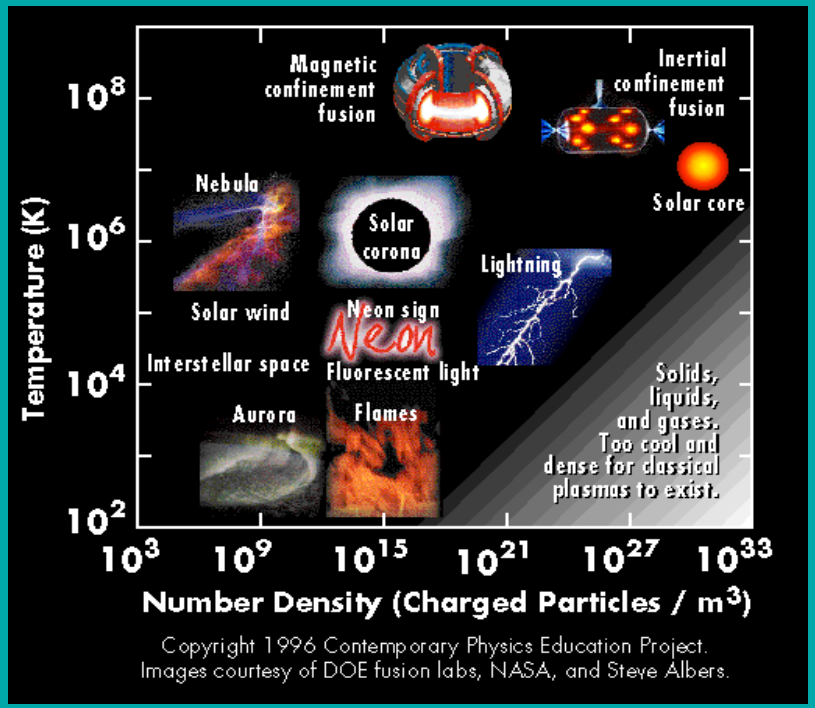
The negatively charged electrons (yellow) are freely streaming through the positively charged ions (blue).



States of Matter

Plasma

Examples



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Microscopic Explanation for Properties of Solids

- Solids have a definite shape and a definite volume because the particles are locked into place
- Solids are not easily compressible because there is little free space between particles
- Solids do not flow easily because the particles cannot move/slide past one another

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Microscopic Explanation for Properties of Liquids

- Liquids have an indefinite shape because the particles can slide past one another.
- Liquids are not easily compressible and have a definite volume because there is little free space between particles.
- Liquids flow easily because the particles can move/slide past one another.

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Microscopic Explanation for Properties of Gases

- Gases have an indefinite shape and an indefinite volume because the particles can move past one another.
- Gases are easily compressible because there is a great deal of free space between particles.
- Gases flow very easily because the particles randomly move past one another.

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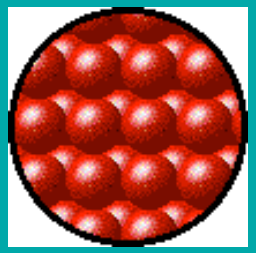
Microscopic Explanation for Properties of Plasmas

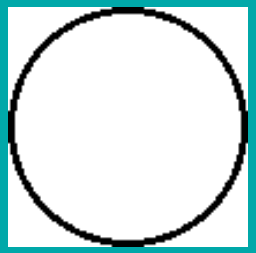
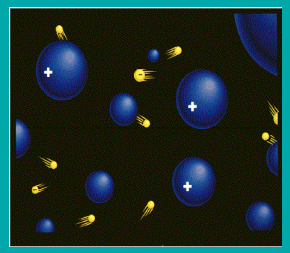
- Plasmas have an indefinite shape and an indefinite volume because the particles can move past one another.
- Plasmas are easily compressible because there is a great deal of free space between particles.
- Plasmas are good conductors of electricity and are affected by magnetic fields because they are composed of ions (negatively charged electrons and positively charged nuclei).

States of Matter

The Four States of Matter

The Classification and Properties of Matter Depend Upon Microscopic Structure



- Particle arrangement
- Particle energy
- Particle to particle distance