

STATES OF MATTER

- ***The Four States of Matter***

- Four States

- Solid
- Liquid
- Gas
- Plasma

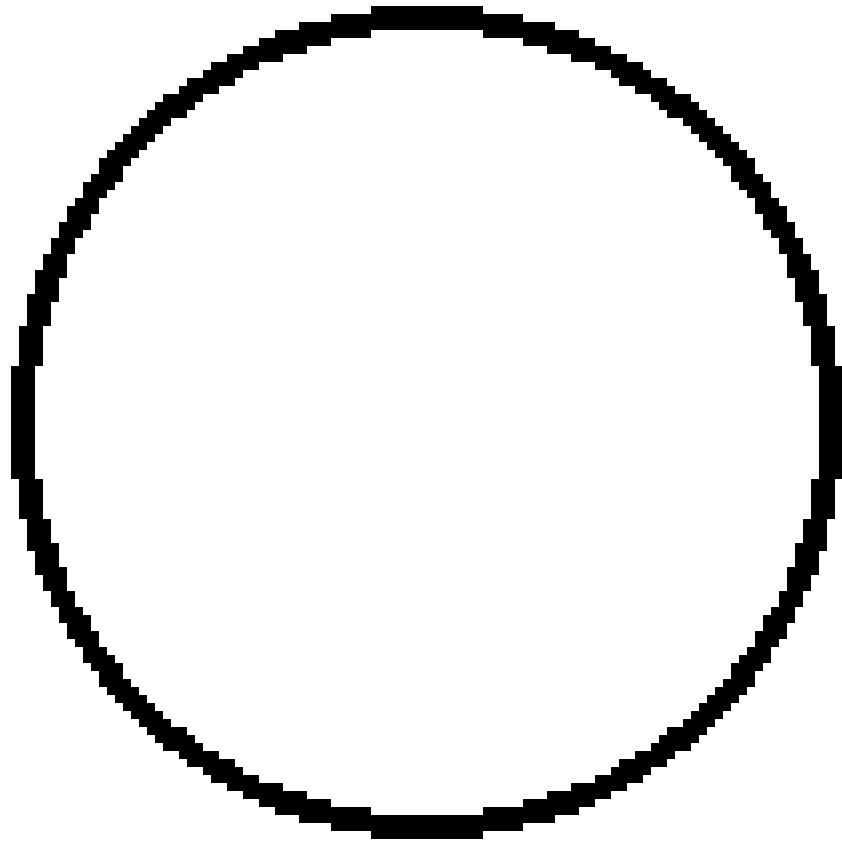
STATES OF MATTER

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



Kinetic Theory of Matter

Matter is made up of particles which are in continual random motion.

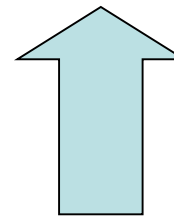
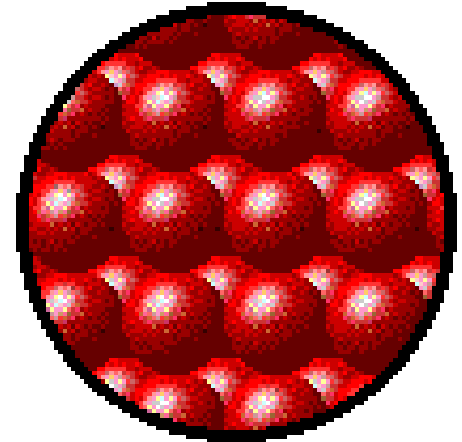


STATES OF MATTER

SOLIDS

- **Particles of solids are tightly packed, vibrating about a fixed position.**

- **Solids have a definite shape and a definite volume.**

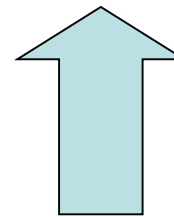
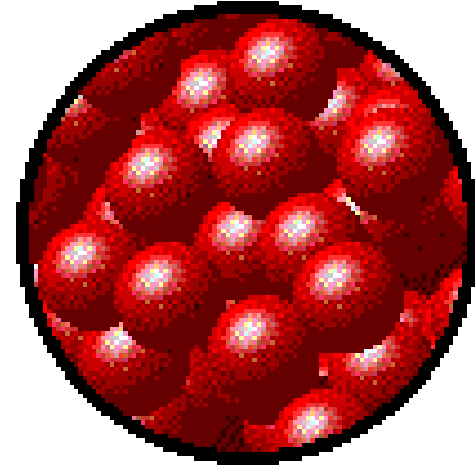


Heat

STATES OF MATTER

LIQUID

- **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.**

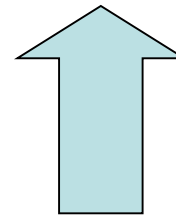
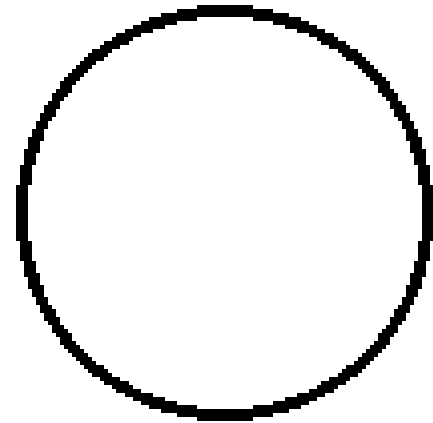


Heat

STATES OF MATTER

GAS

- **Particles of gases are very far apart and move freely.**
- **Gases have an indefinite shape and an indefinite volume.**



Heat

PHASE CHANGES

**Description of
Phase Change**

**Term for Phase
Change**

**Heat Movement During
Phase Change**

**Solid to
liquid**

Melting

**Heat goes into
the solid as it
melts.**

**Liquid to
solid**

Freezing

**Heat leaves the
liquid as it
freezes.**

PHASE CHANGES

**Description of
Phase Change**

**Term for Phase
Change**

**Heat Movement During
Phase Change**

**Liquid to
gas**

**Vaporization,
which includes
boiling and
evaporation**

**Heat goes into the
liquid as it vaporizes.**

Gas to liquid

Condensation

**Heat leaves the gas
as it condenses.**

Solid to gas

Sublimation

**Heat goes into the
solid as it sublimates.**

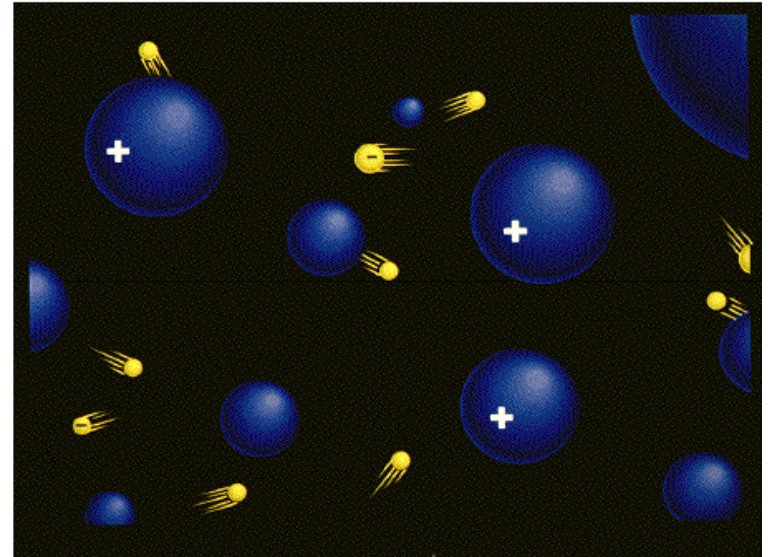
**But what happens if you raise the
temperature to super-high levels...
between
1000°C and 1,000,000,000°C ?**

**Will everything
just be a gas?**

STATES OF MATTER

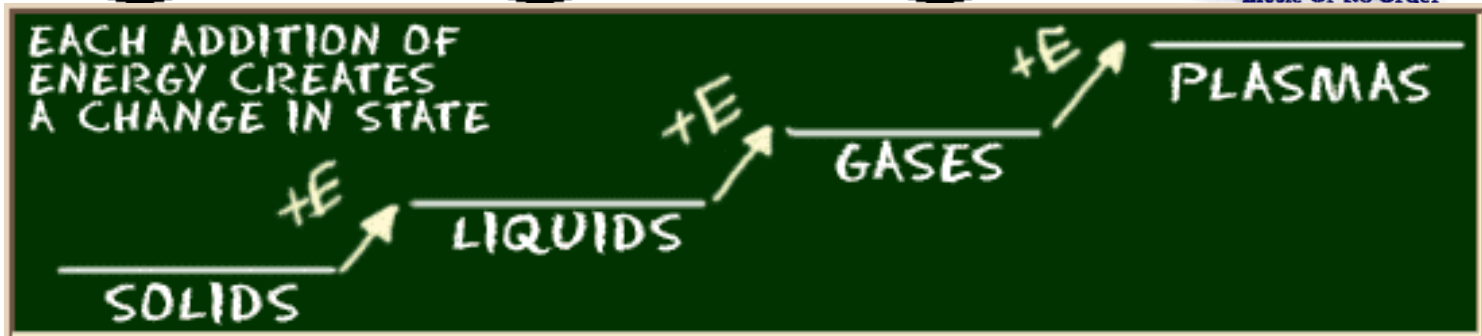
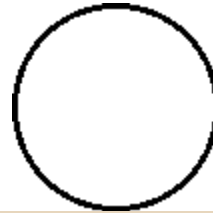
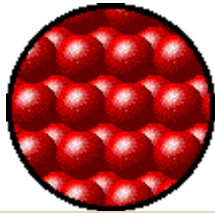
PLASMA

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



- **Plasma is the common state of matter**

STATES OF MATTER



SOLID

Tightly packed, in a regular pattern
Vibrate, but do not move from place to place

LIQUID

Close together with no regular arrangement.
Vibrate, move about, and slide past each other

GAS

Well separated with no regular arrangement.
Vibrate and move freely at high speeds

PLASMA

Has no definite volume or shape and is composed of electrical charged particles

Some places where plasmas are found...

1. Flames

A close-up photograph of a fire with bright orange and yellow flames against a dark background. The flames are intense and appear to be part of a larger fire.



2. Lightning

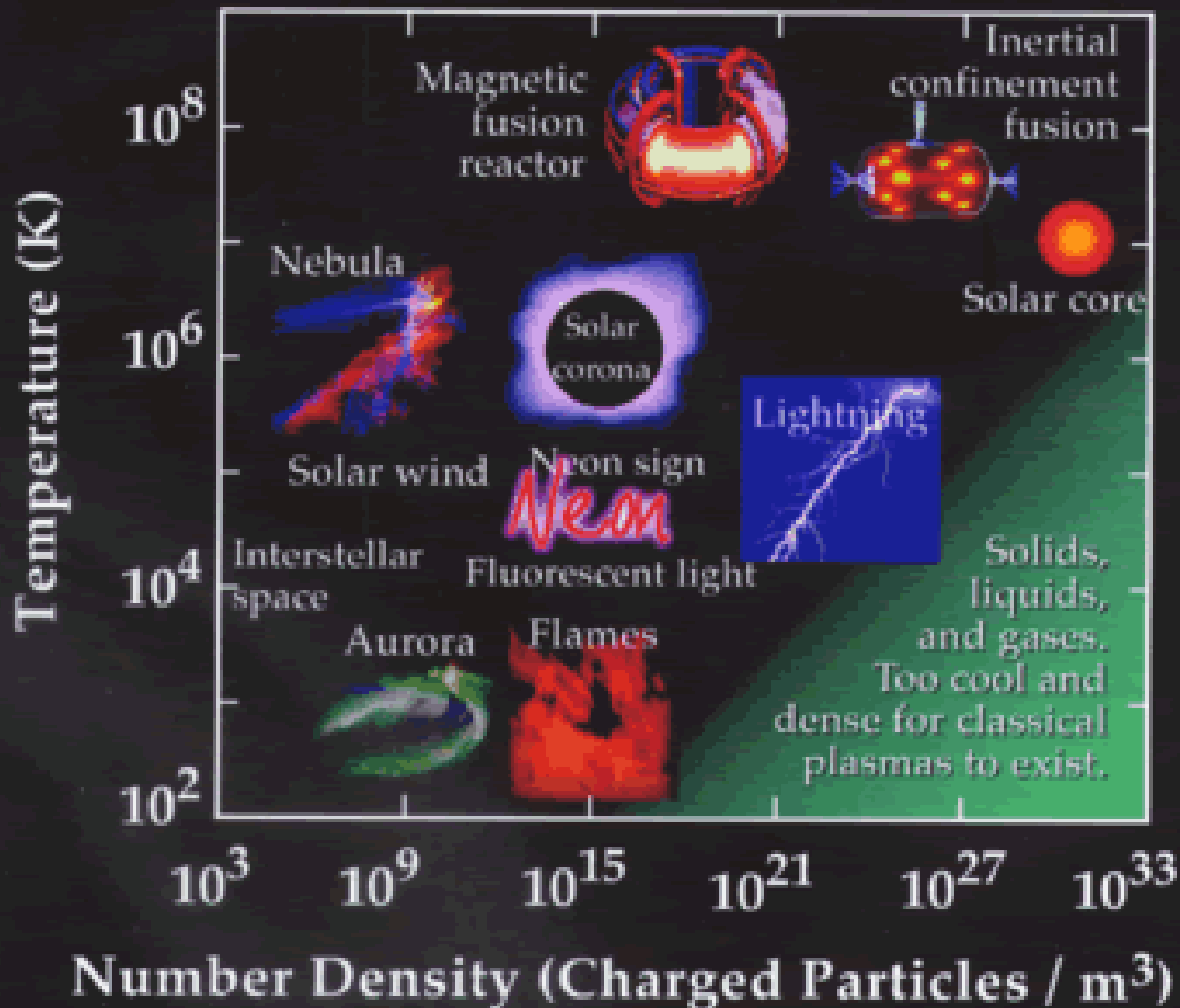
3. Aurora (Northern Lights)



**The Sun is an example of a star in its
plasma state**



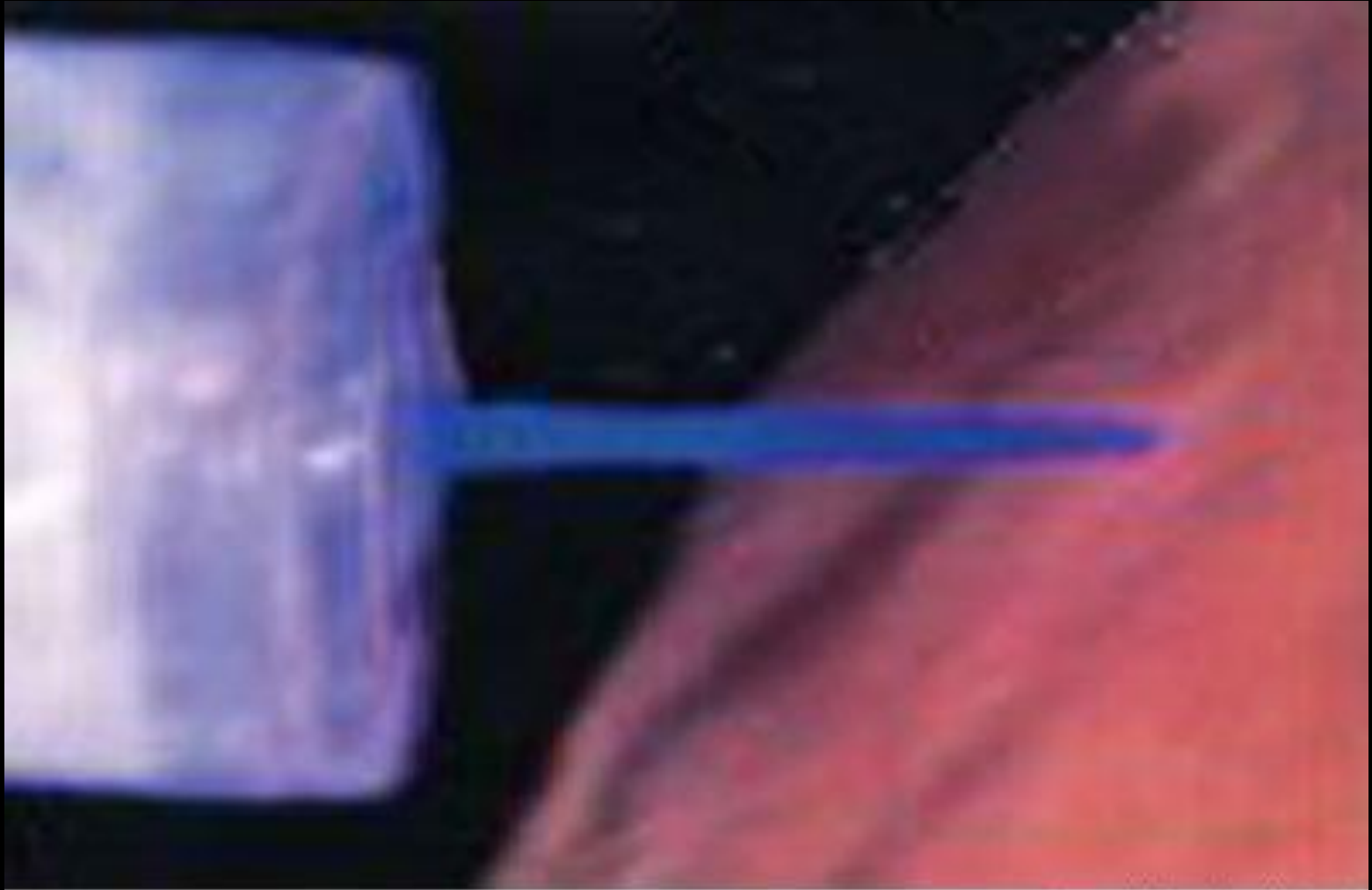
Plasmas - The 4th State of Matter



COLD PLASMA



COLD PLASMA PEN



Source: Old Dominion University