



# General Chemistry



## Matter and Measurement

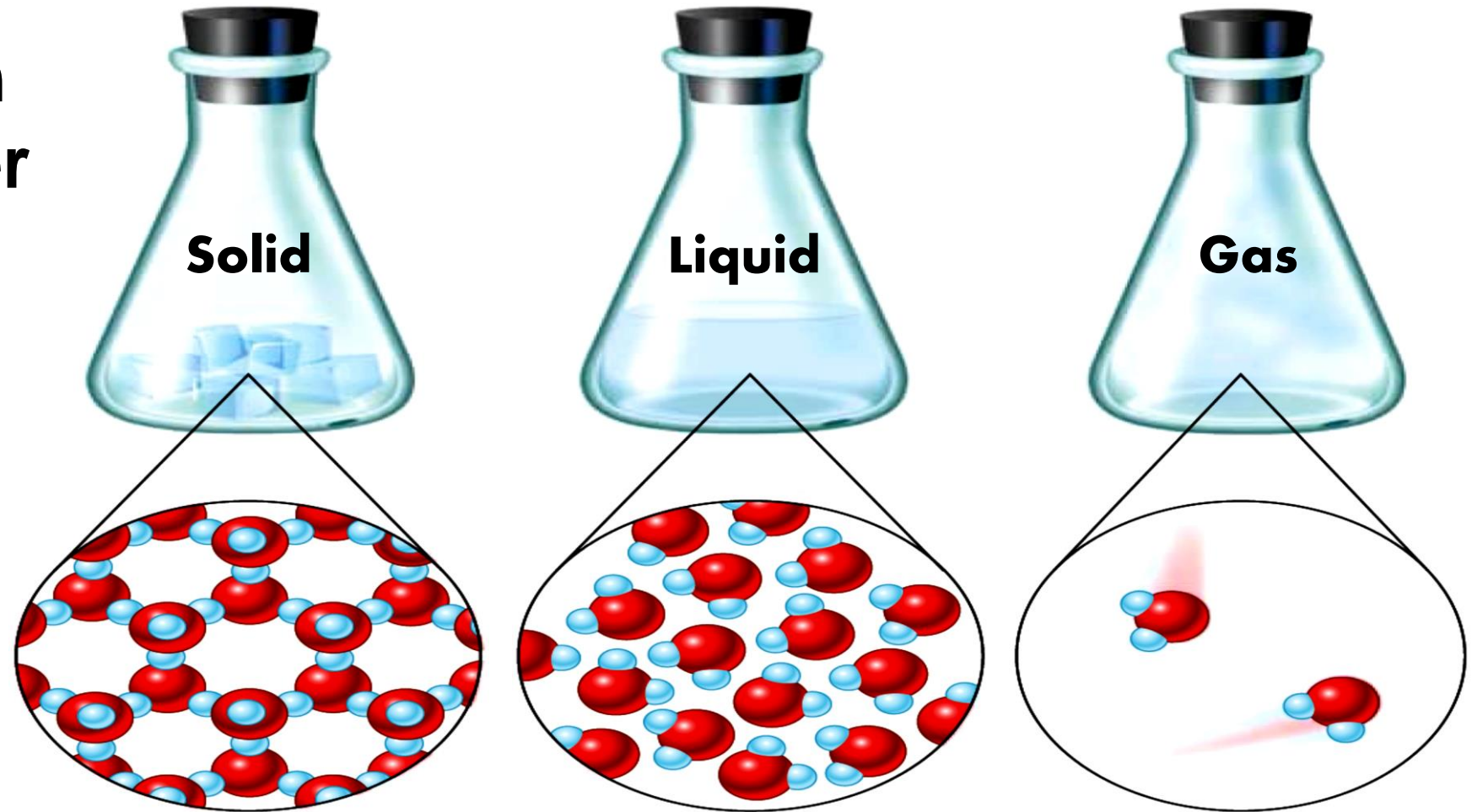
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# **States of Matter**

**(fundamental states of matter)**

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# The three main states of matter



Characteristic
<b>Shape</b>
<b>Volume</b>
<b>Arrangement of particles</b>
<b>Interaction between particles</b>
<b>Movement of particles</b>
<b>Examples</b>

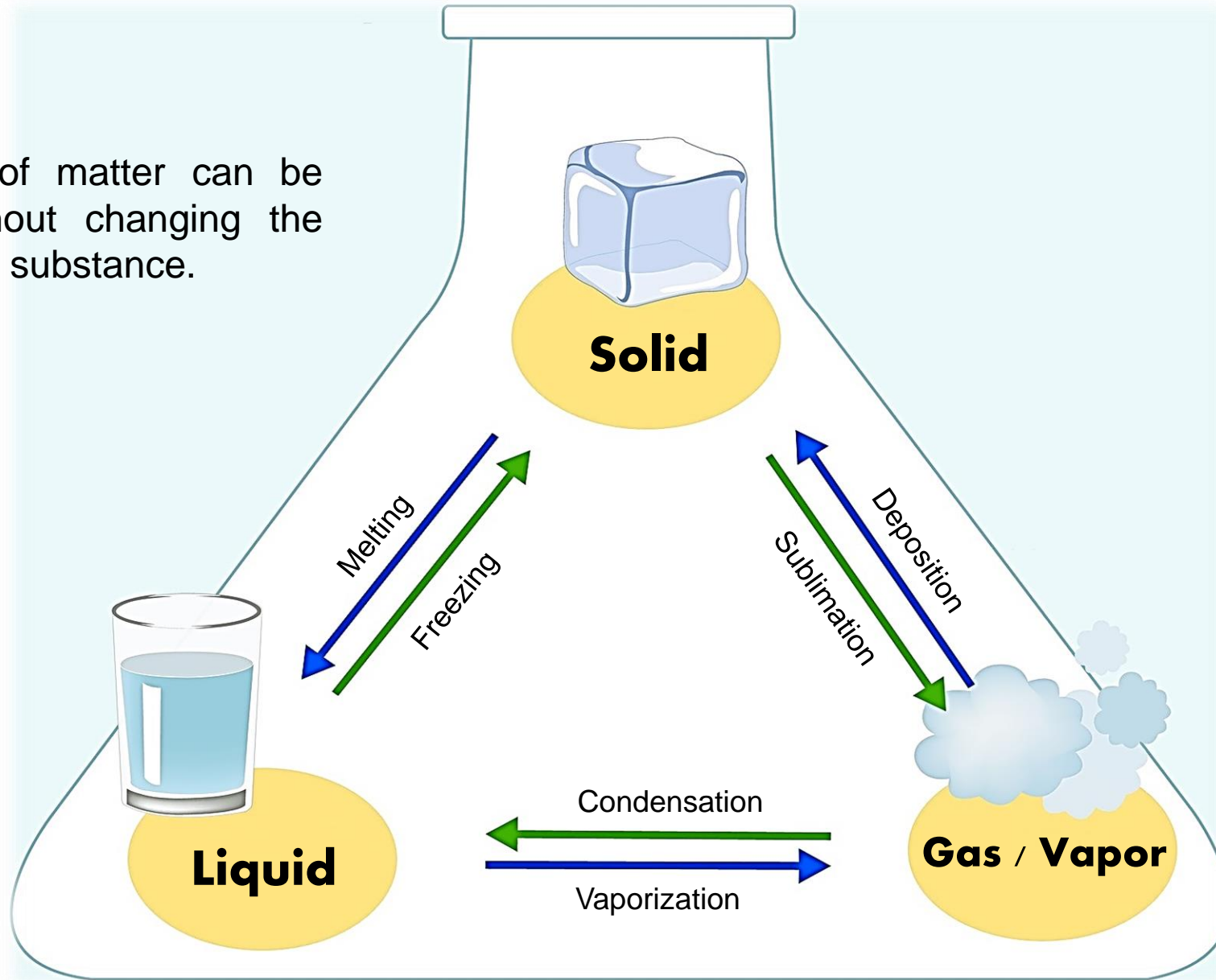
Has a definite shape
Has a definite volume
Fixed, very close
Very strong
Very slow
Ice, salt, iron

Takes the shape of the container
Has a definite volume
Random, close
Strong
Moderate
Water, oil, vinegar

Takes the shape of the container
Fills the volume of the container
Random, far apart
Essentially none
Very fast
Water vapor, helium, air

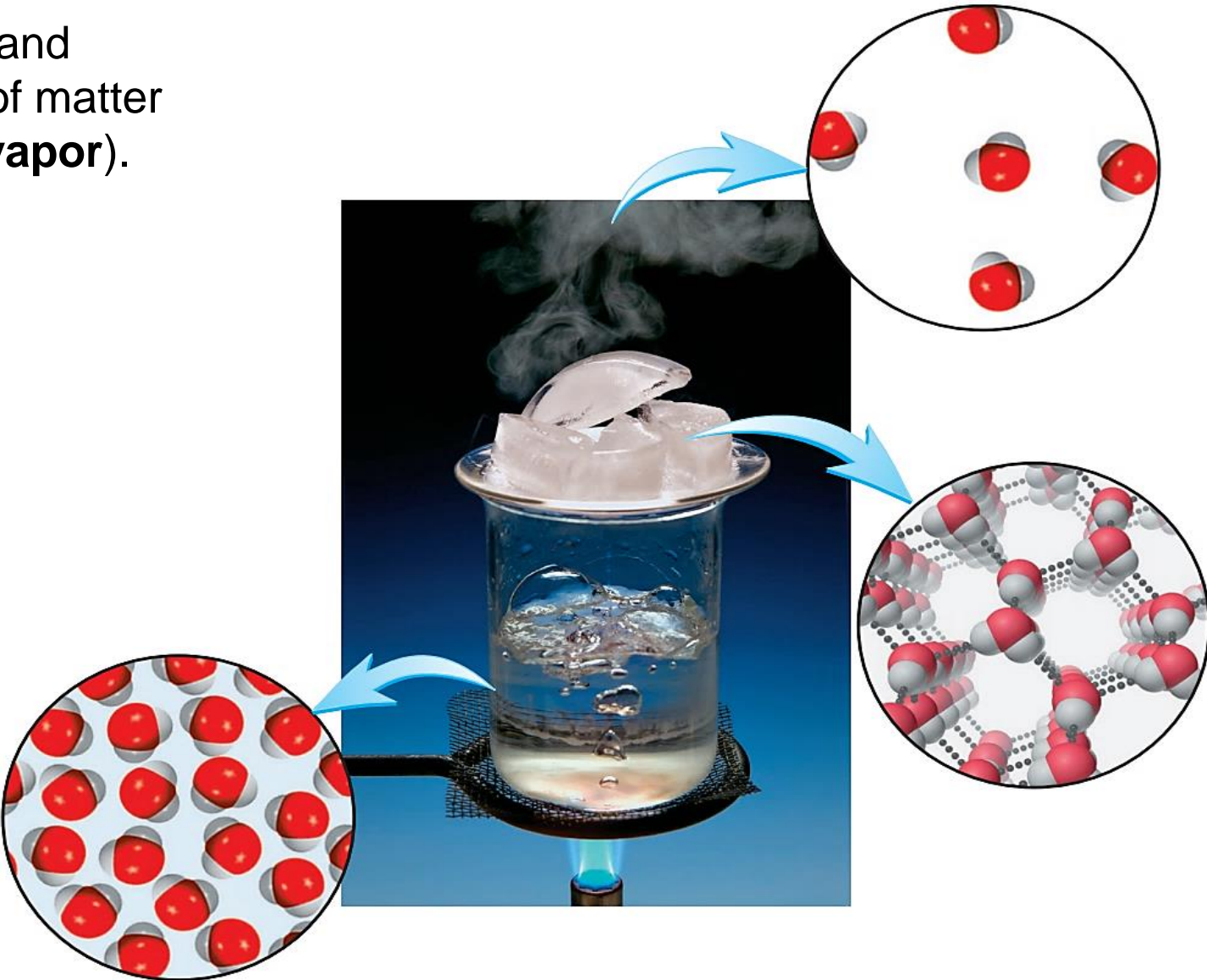
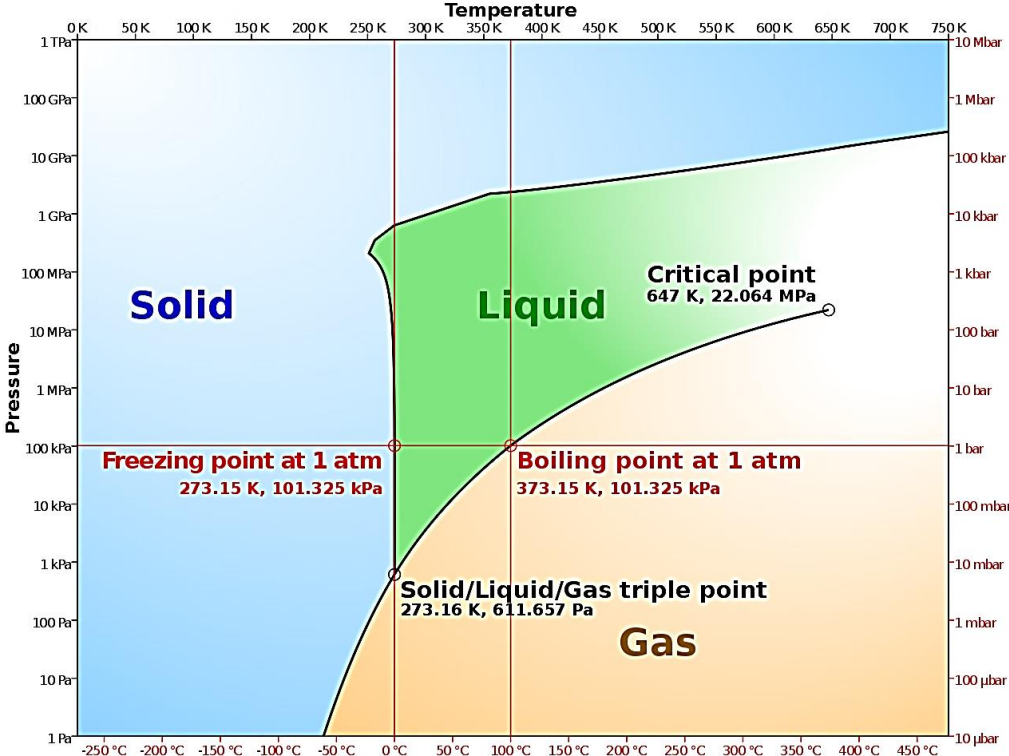
# Phase transitions (phase changes)

The three states of matter can be interconverted without changing the **composition** of the substance.



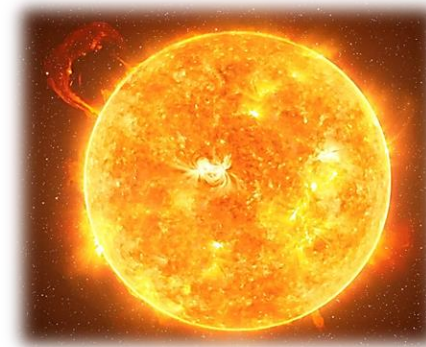
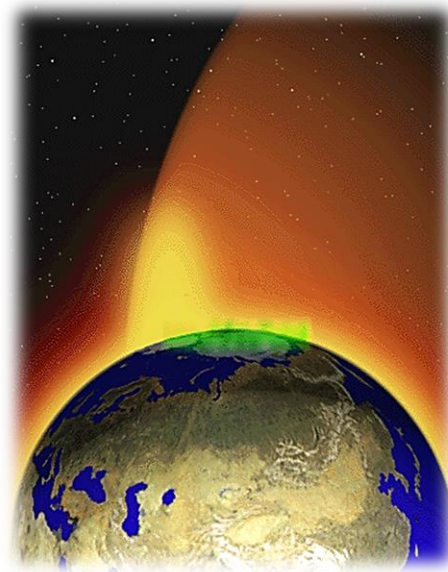
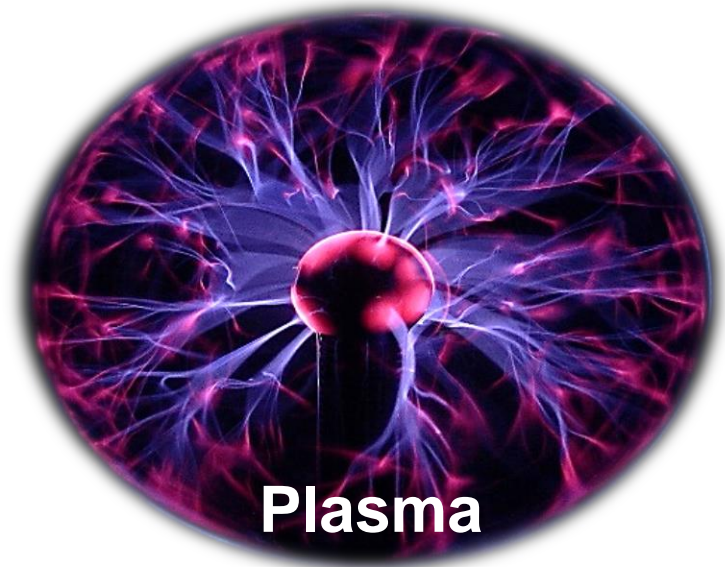
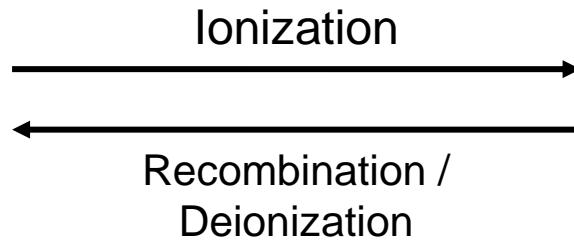
Water has the same composition and chemical structure in the three states of matter (solid ice, liquid water, and water vapor).

### Phase diagram of water



The three states of water

# Plasma



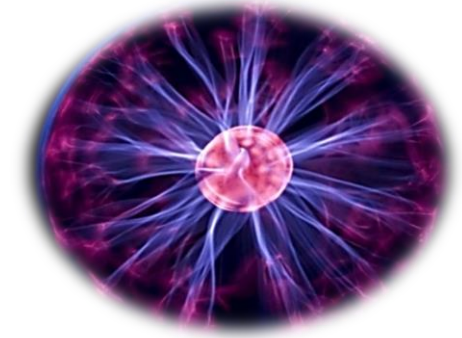
## Fundamental states

Solid

Liquid

Gas

Plasma



## Non-classical states

Amorphous solid

Liquid crystal

Supercritical fluid

Bose-Einstein condensate

Fermionic condensate

Superfluid

Superconductor

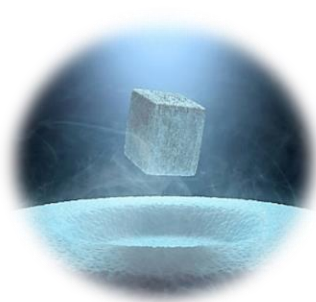
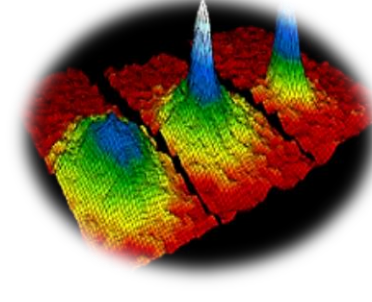
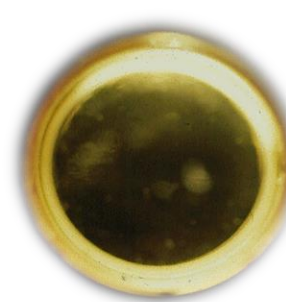
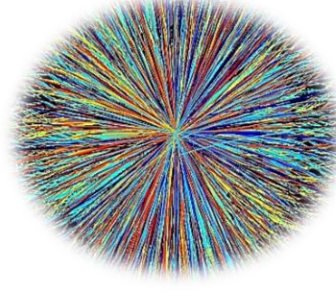
Rydberg polaron

Quantum spin Hall state

Degenerate matter

Time crystal

Quark matter



**Next topic in this series...**



# **Other States of Matter** **(non-classical states)**



*Thank You!*

A colorful brushstroke graphic located below the 'Thank You!' text. It features horizontal strokes in shades of cyan, purple, pink, and yellow, with a white outline of the word 'Thank' visible through the colors.