

Chiral Bose-Liquid State

June 25, 2023 • vajiramandravi.com



About Chiral Bose-Liquid State:

- Usually matter exists in **solid, liquid or gas forms**.
- At temperatures approaching absolute zero, or the world within the atom, things are very different.
- In these “quantum” states, matter behaves in ways quite different from the solid, liquid, and gaseous states.
- Under frustrated quantum systems, where infinite possibilities result from the interaction of particles.

How it was formed?

- Researchers used a **bi-layer semiconducting device**.
- The top **layer is electron-rich**, and these electrons can move freely.
- The bottom layer is **filled with “holes,”** or places that a roving electron can occupy.
- Then the two layers are brought extremely close together. The machine is then triggered to create a local imbalance resulting in electrons not having enough holes to fill and this kicks off the novel state called the chiral bose-liquid state.
- In this state, **electrons can be frozen into predictable patterns**, making them resilient to changes in spin (a defining characteristic of subatomic particles) and even have electrons synchronise their movements.

- It is very difficult to create such states of matter but going ahead may be used to fashion novel digital encryption systems.

What is Chiral?

- The term chiral is from the Greek word for 'hand' which refers to anything which **cannot be superimposed on its own mirror image.**

Q1) What are Electrons?

Electrons are subatomic particles that orbit the nucleus of an atom. They have a negative electrical charge and are one of the fundamental building blocks of matter. Electrons are found in all atoms, and their arrangement determines the chemical properties and behavior of different elements.

Source: [Science for All | What is the chiral bose-liquid state?](#)

Source: <https://vajiramandravi.com/current-affairs/chiral-bose-liquid-state/>

© Vajiram & Ravi. For personal use only.