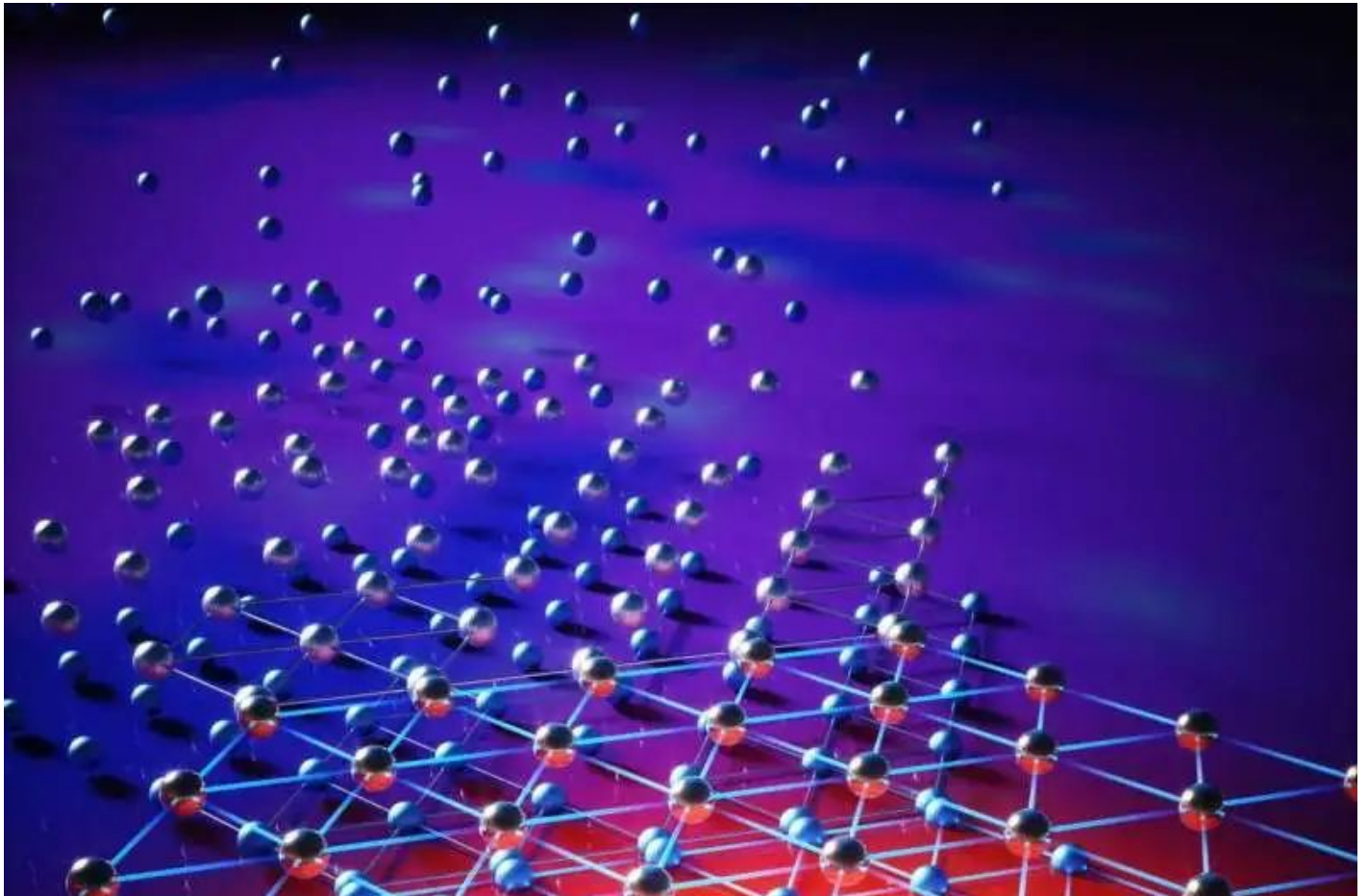


What is Wigner Crystal?

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About Wigner Crystal

- A Wigner crystal is the **solid phase of electrons**, first **predicted by Eugene Wigner** in 1934.
- It is one of the very first proposed many-body phases **stabilized by the electron-electron interaction**.
- **Formation:**
 - **Interaction among electrons** could lead to their spontaneous **arrangement into a crystal-like configuration, or lattice, of closely packed electrons**.
 - This could only occur **because of their mutual repulsion** and under conditions of **low densities and extremely cold** temperatures.
 - This is because the **potential energy dominates the kinetic energy at low densities**, so the detailed spatial arrangement of the electrons becomes important.
 - **To minimize the potential energy, electrons form a crystal-like configuration.**
- **A true Wigner crystal**, instead of following the familiar laws of physics in the everyday world, would follow the laws of **quantum physics**, in which the electrons would act not like individual particles but more like a

single wave.

- Wigner crystal is stable at extremely low densities. **If the density increases**, the kinetic energy becomes important, and eventually the **crystal melts**.
- Wigner crystal is very **difficult to observe experimentally**. The reason is that it is **very fragile** with respect to the environment.

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Q1: What is quantum physics?

Quantum physics is the study of matter and energy at the most fundamental level. Quantum mechanics is a subfield of physics that describes the behavior of particles — atoms, electrons, photons and almost everything in the molecular and submolecular realm.

Source: [Quantum crystal of frozen electrons—the Wigner crystal—is visualized for the first time](#)

Source: <https://vajiramandravi.com/current-affairs/wigner-crystal/>

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