



An artist's impression of the structure of a Wigner crystal made of electrons (red) inside a semiconductor material (blue and gray) ETH Zurich

Researchers at ETH Zurich have created a crystal made entirely of electrons. The structures have been theorized for decades, but this marks the first time they've been experimentally confirmed in the lab.

Normally, electrons behave more or less like a liquid, flowing freely through a material. But in 1934, theoretical physicist Eugene Wigner predicted that a group of electrons could crystallize into a solid form under specific conditions, forming a phase now known as a Wigner crystal.

s: their electrostatic repulsion and their motional energy. The latter is the more powerful effect, causing electrons to bounce around at random, but if that could be reduced enough, Wigner proposed, then the repulsion could take over, locking the electrons into a uniform lattice.

But that proved trickier than it may sound. The density of electrons needs to be lowered beyond a certain point, they need to be confined in a "trap", and they need to be cooled almost to absolute zero, to reduce outside influence on their movement.

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