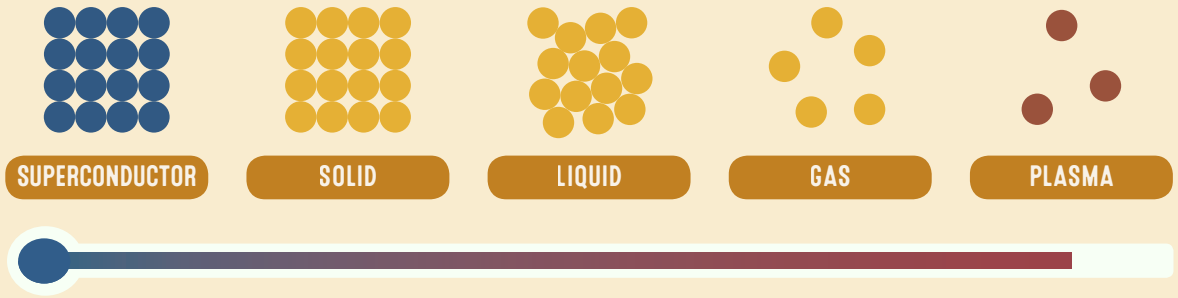
2016 NOBEL PRIZE IN PHYSICS

The Nobel Prize in Physics 2016 was awarded to David Thouless, Duncan Haldane, and Michael Kosterlitz for using mathematical models to explain strange behaviour in unusual states of matter.

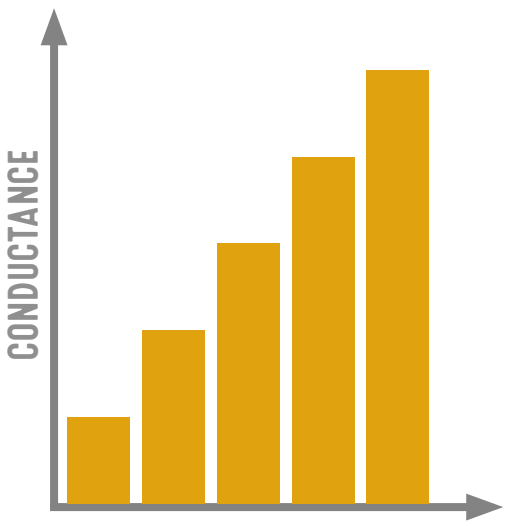
UNUSUAL PHASES OF MATTER



Unusual phases of matter occur at very high or low temperatures. At low temperatures, solids can become superconductors, and allow electricity to flow without resistance. Theory predicted this couldn't happen in two dimensional systems – the Nobel-winning research showed it could.

TOPOLOGY, BAGELS, AND SUPERCONDUCTORS

When a thin conducting layer is cooled to near absolute zero and placed in magnetic field, its conductance varies as the magnetic field changes. However, it changes in integer steps, something physics couldn't explain. This problem was one of those solved by the Nobel Laureates using topology.



Topology refers to properties unaffected by size or shape of an object. For example, a bagel and a picture frame are topologically identical: they both have one hole. Electrons in the conducting layer act as one entity, and as such their conductance goes up in integer steps.

WHY DOES THIS RESEARCH MATTER?

Though this research may seem abstract, researchers have since discovered topological states of matter in ordinary 3D materials. They could be used in electronics, insulators, superconductors, and future quantum computers. Research on them is still ongoing.

Nobel Prize in Physics Press release: https://www.nobelprize.org/nobel_prizes/physics/laureates/2016/press.html

COMPOUND INTEREST