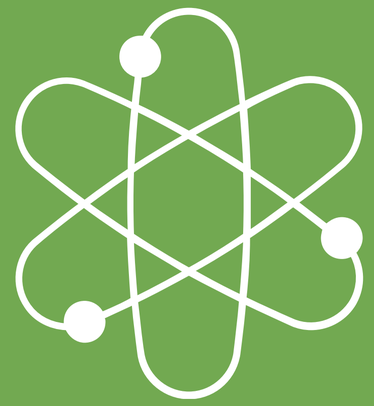
THE
NOBEL
PRIZE

PHYSICS PRIZE 2025

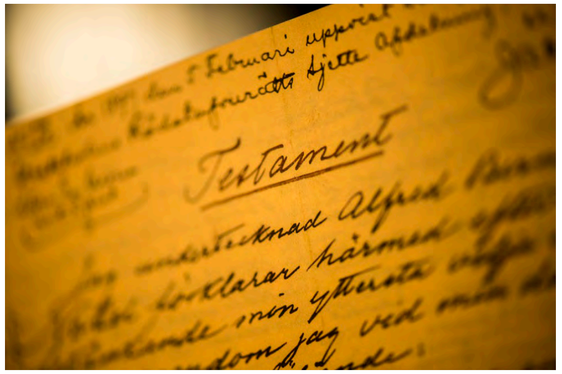


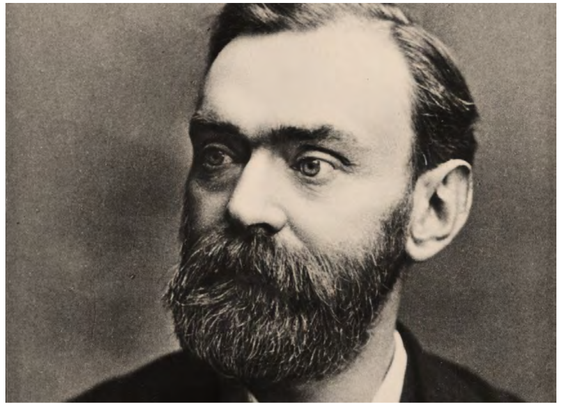
Nobel Prize lessons

The Nobel Prize in Physics

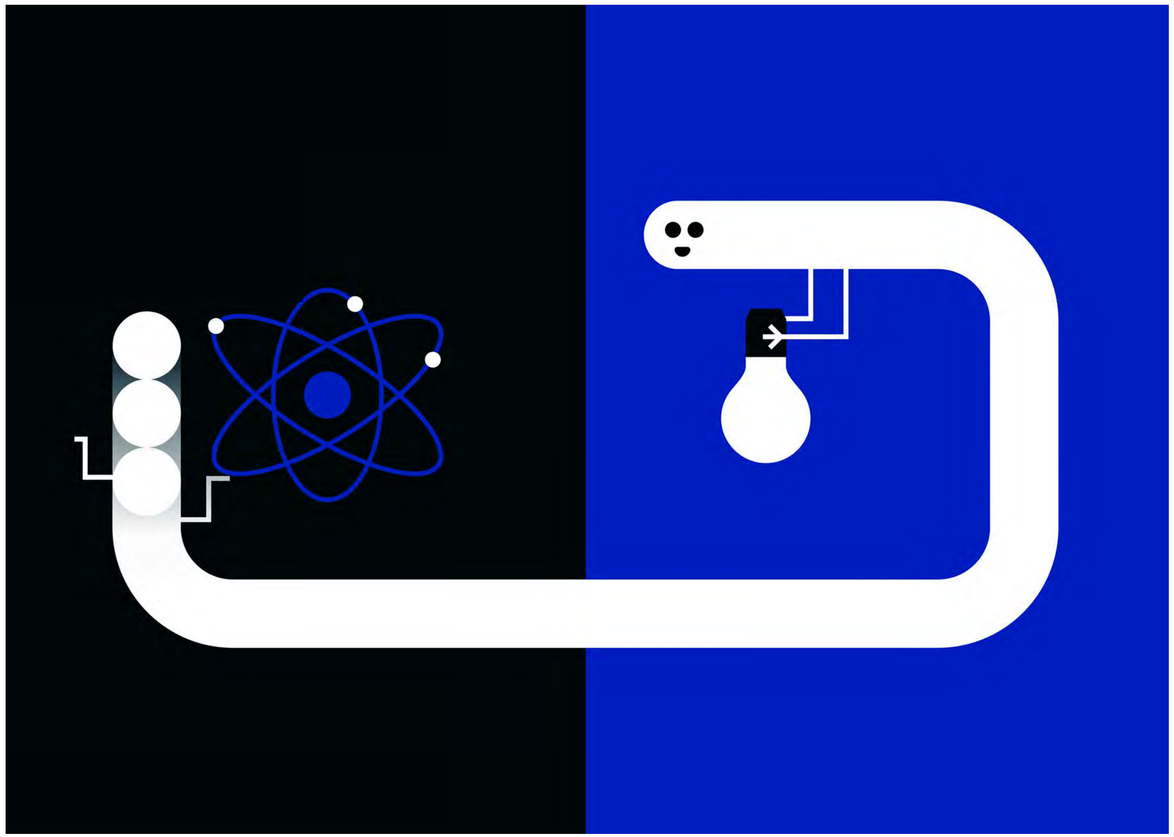
"to the person who made the most important discovery or invention in the field of physics"

Alfred Nobel (1833–1896)





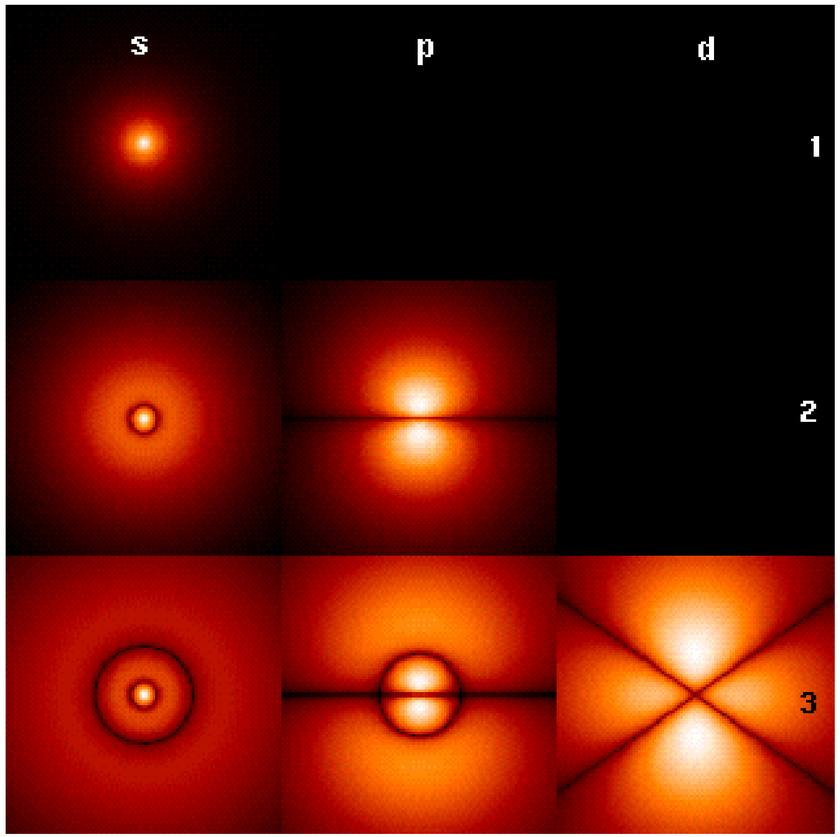
The 2025 physics prize – Quantum properties on a human scale



The 2025 physics prize is about quantum mechanical effects in electrical circuits.

What is quantum mechanics?

Quantum mechanics – a strange world



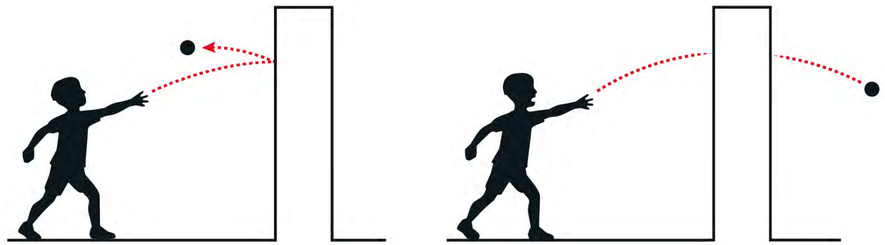
Quantum mechanics mainly describes things that are very small, such as atoms and electrons.

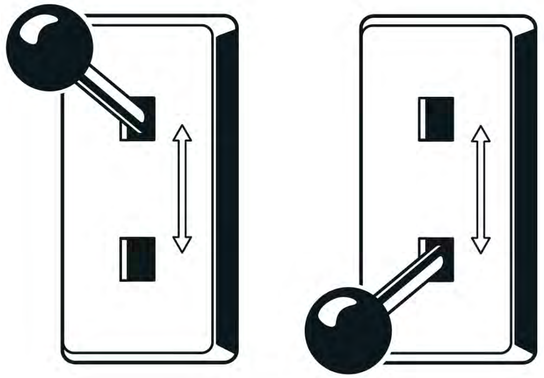
Everything happens in steps. For example, electrons in an atom jump between different energy levels.

It is not possible to predict exactly what will happen, as this is instead determined by chance and probabilities.

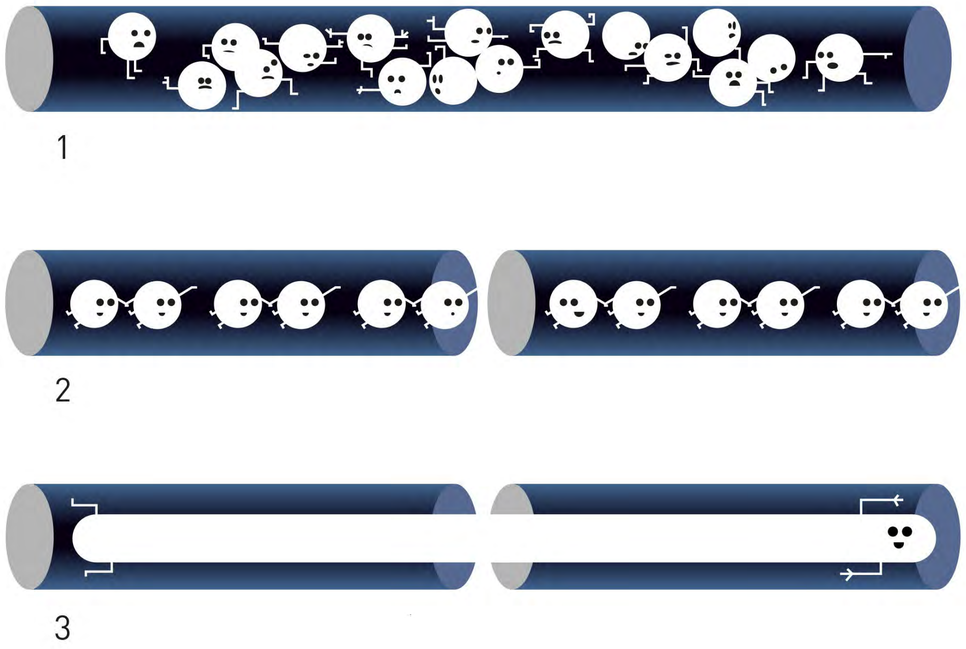
Tunnelling

Tunnelling refers to passing through barriers that should actually be impossible to pass through.





Superconductivity and tunnelling



1. In a regular conductor, electrons jostle with each other and with atoms. This causes resistance.
2. In a superconducting state, the electrons form pairs, and the current may flow without resistance. But an insulating gap may stop the current.
3. A large number of pairs of electrons may sometimes behave like a single particle. This enables a current to tunnel across the insulating gap.

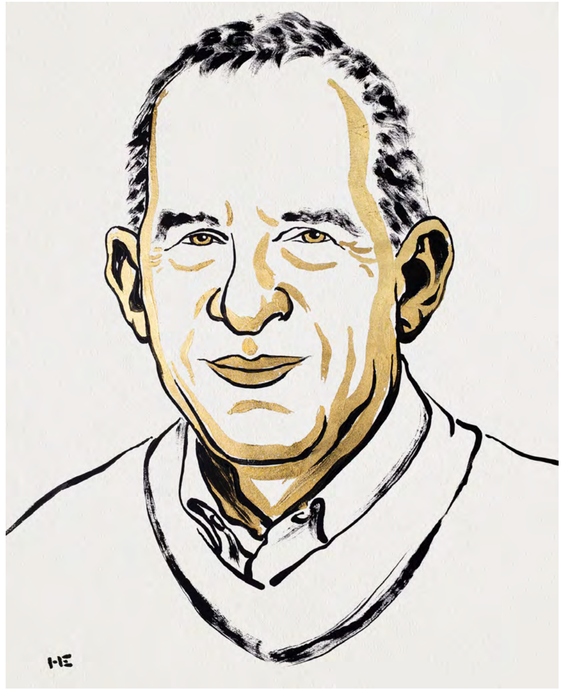
The 2025 Nobel Prize laureates in physics

"for the discovery of macroscopic quantum mechanical tunnelling and energy quantisation in an electric circuit"

"None of this work would have happened without the two of them"

John Clarke

John Clarke
Born: 1942, United Kingdom



Michel Devoret
Born: 1953, France

John Martinis
Born: 1958

What could these discoveries lead to?

- A better understanding of different quantum systems
- Quantum computers, quantum sensors and quantum encryption

THE
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PRIZE

FOR THE GREATEST BENEFIT TO HUMANKIND

Nobel Prize lessons