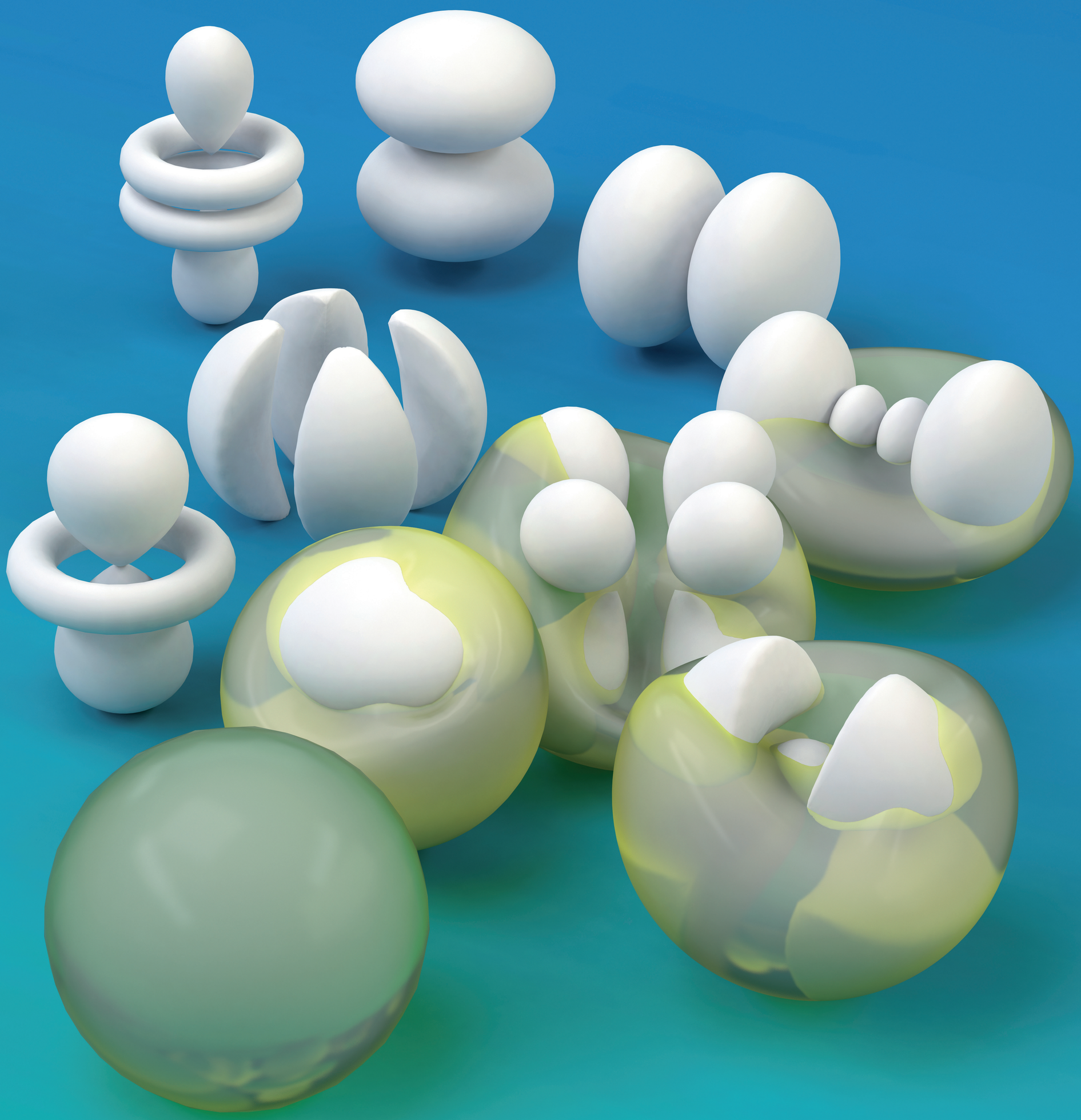
THE ATOM, A BOX OF ELECTRONS

An atom consists of a nucleus that creates a sort of electric box around it containing electrons. These quantum particles can only take a few specific shapes, called orbitals, depending on the shape of the ‘box’ itself.



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THE TUNNEL EFFECT

In quantum mechanics, if you send an electron or an atom against a wall, it will bounce back. But if that wall is very thin, it may either bounce or go through. This is called the tunnel effect.

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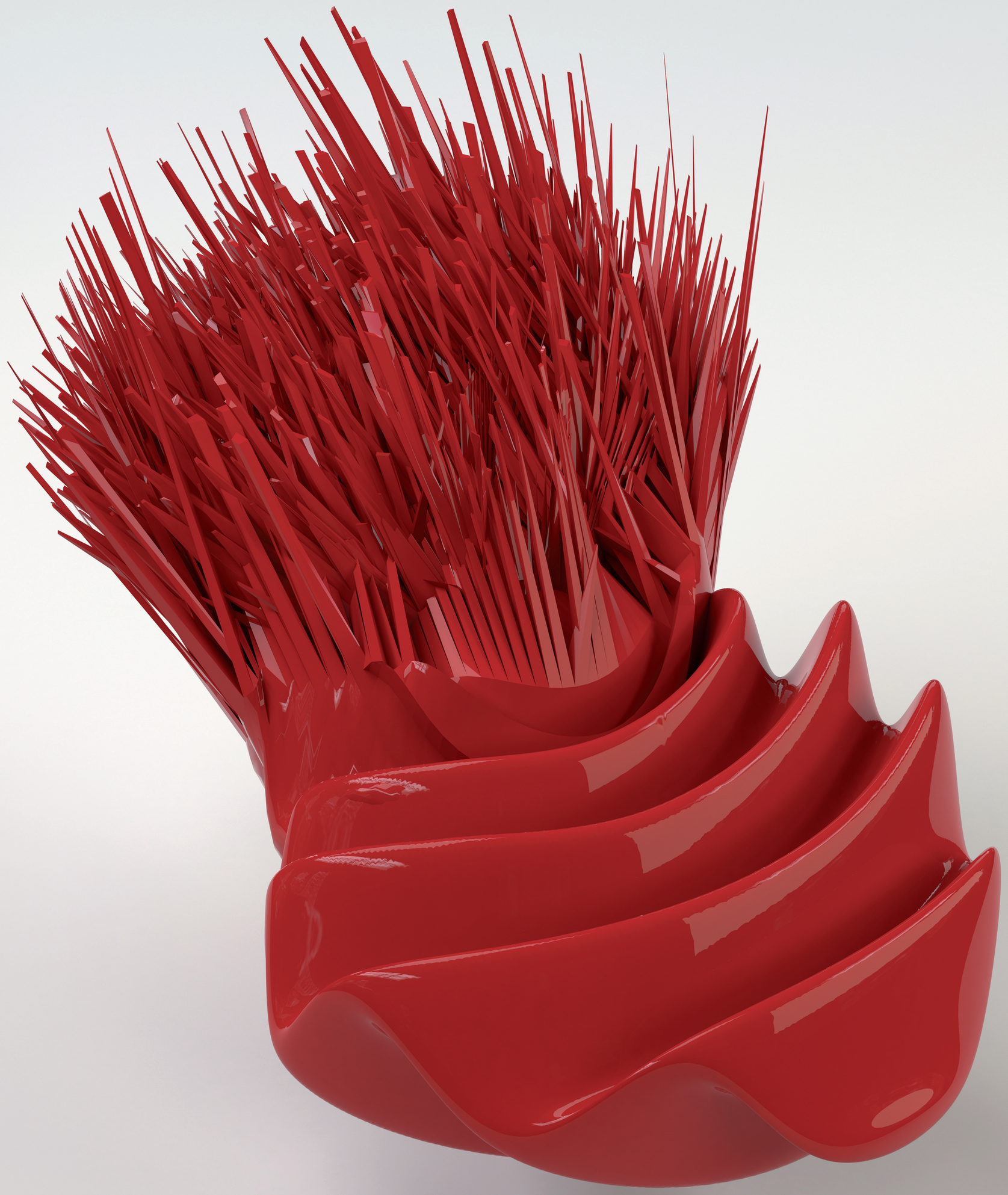

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BOSE-EINSTEIN CONDENSATE

At very low temperatures atoms can sometimes form a single collective huge quantum wave.

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PHOTOEMISSION

When photons are directed at a metal they can eject electrons from the surface of this metal. We then observe these electrons to create a map of their momentum, which helps us understand the properties of matter.

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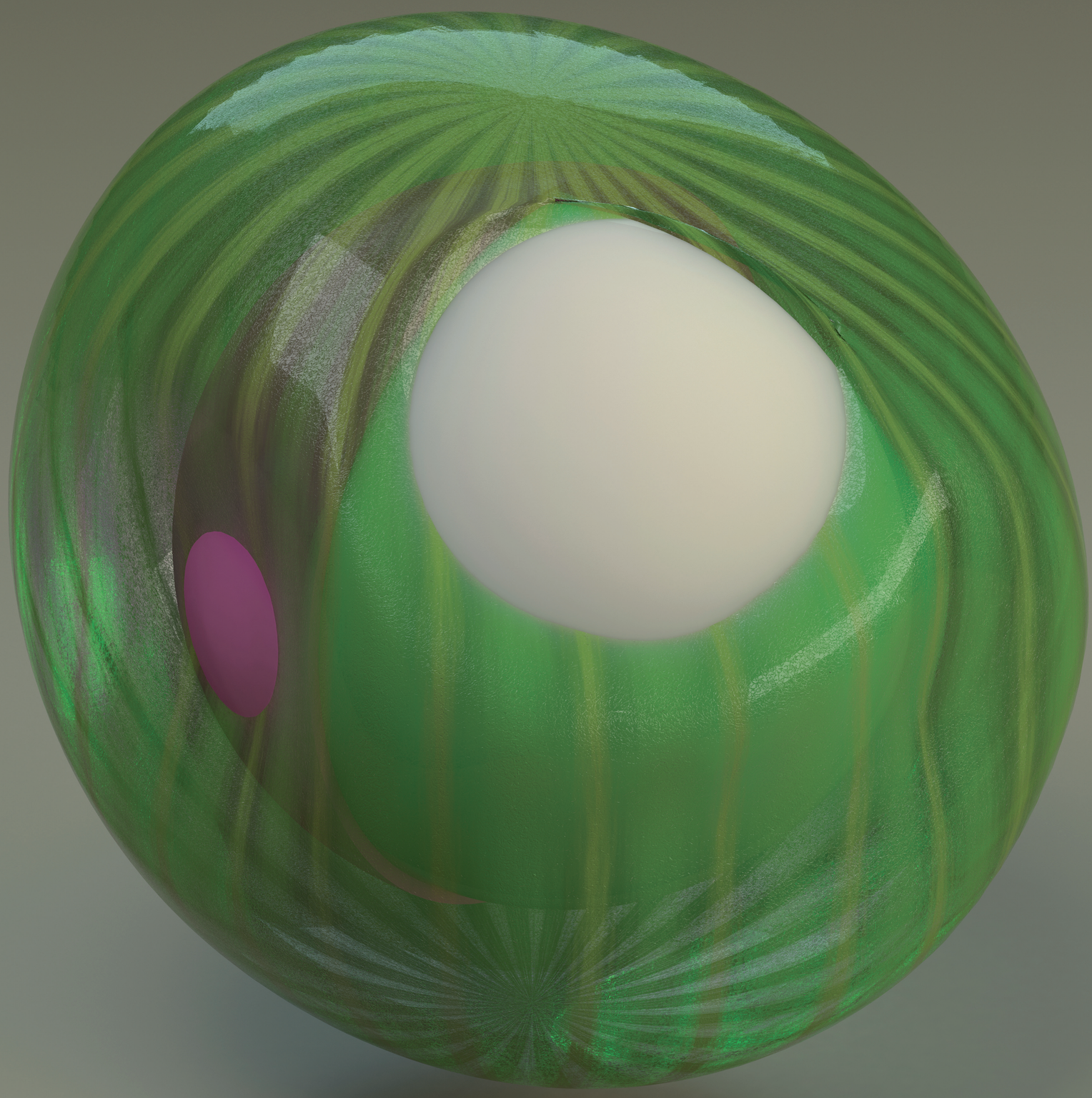

STATE SUPERPOSITION

Some quantum systems such as atoms, photons or spins can be in two simultaneous different states. But this superposition is very frail and will stop as soon as the particle interacts with its environment.

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PUMP-PROBE TECHNIQUE

With ultrashort laser pulses we are able to observe ultrafast phenomena inside matter, such as the movement of atoms or electron excitation.

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GRAPHENE

Graphene consists of a single layer of carbon atoms. Neither entirely metallic nor entirely insulating, its electrons are characterized by Dirac cones that lead to relativistic behaviors similar to the behavior of light.

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CRYSTALLOGRAPHY

When you shed an X-ray beam on a solid, the diffracted light forms a pattern called reciprocal lattice. This lattice is the key to determining the arrangement of atoms inside matter.

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