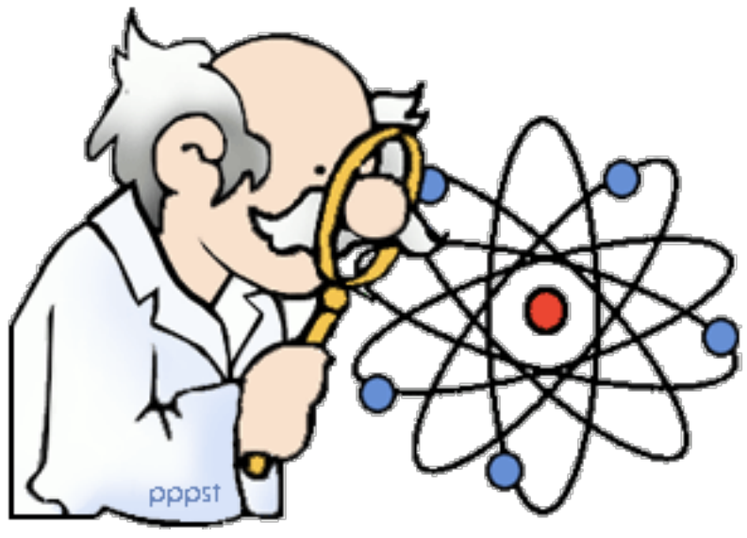
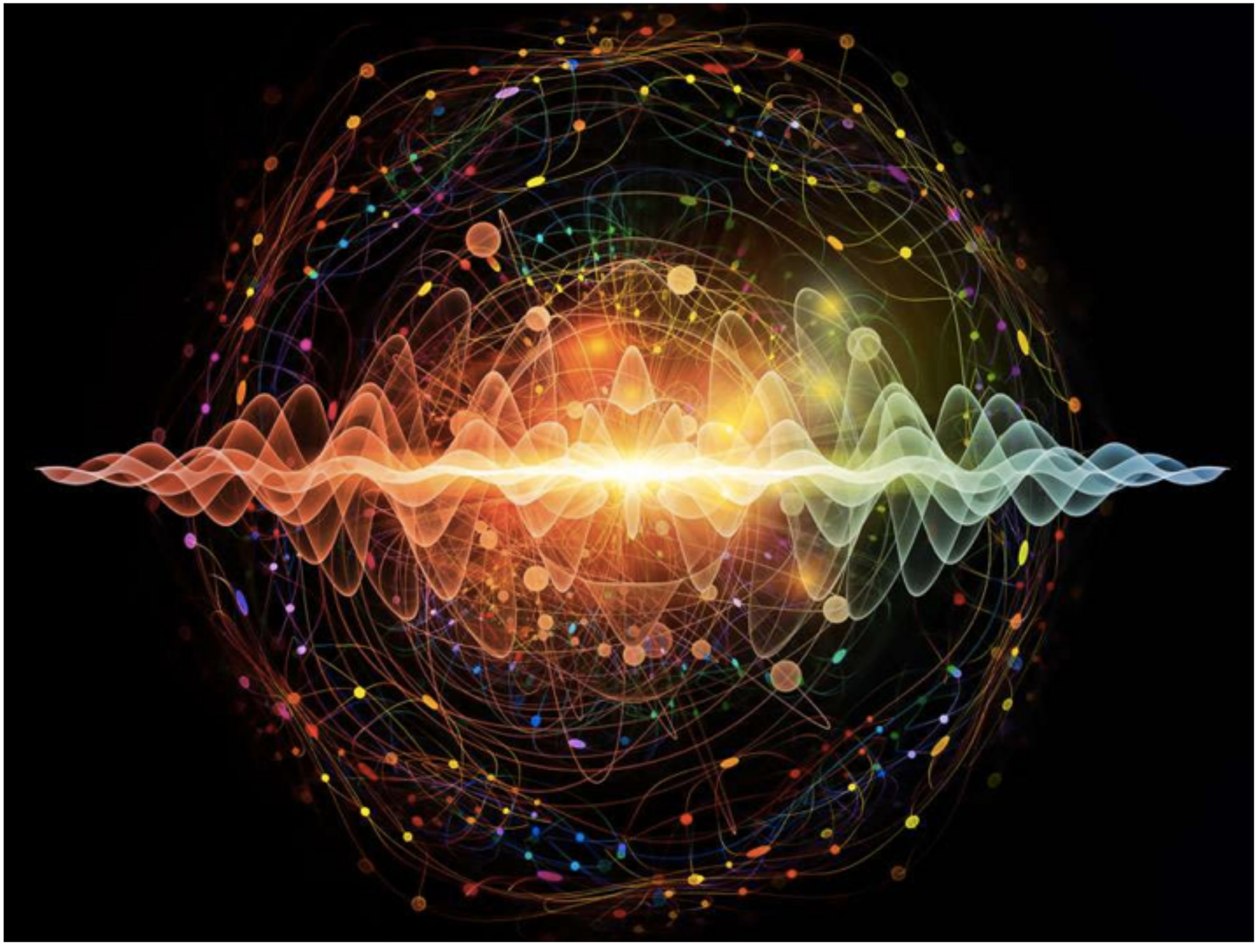
The world of Quantum Physics



What we will learn today

- What is Quantum Physics?
- What are the most fundamental particles?
- What are the laws that govern the Quantum World
- How does a quantum scientist look like and what does she do?

What is QUANTUM PHYSICS?



Question: what do you think quantum physics is?

What is QUANTUM PHYSICS?

QUANTUM PHYSICS IS ALL AROUND US, IT IS THE WORLD OF VERY SMALL PARTICLES, THESE ARE CALLED MICROSCOPIC PARTICLES.

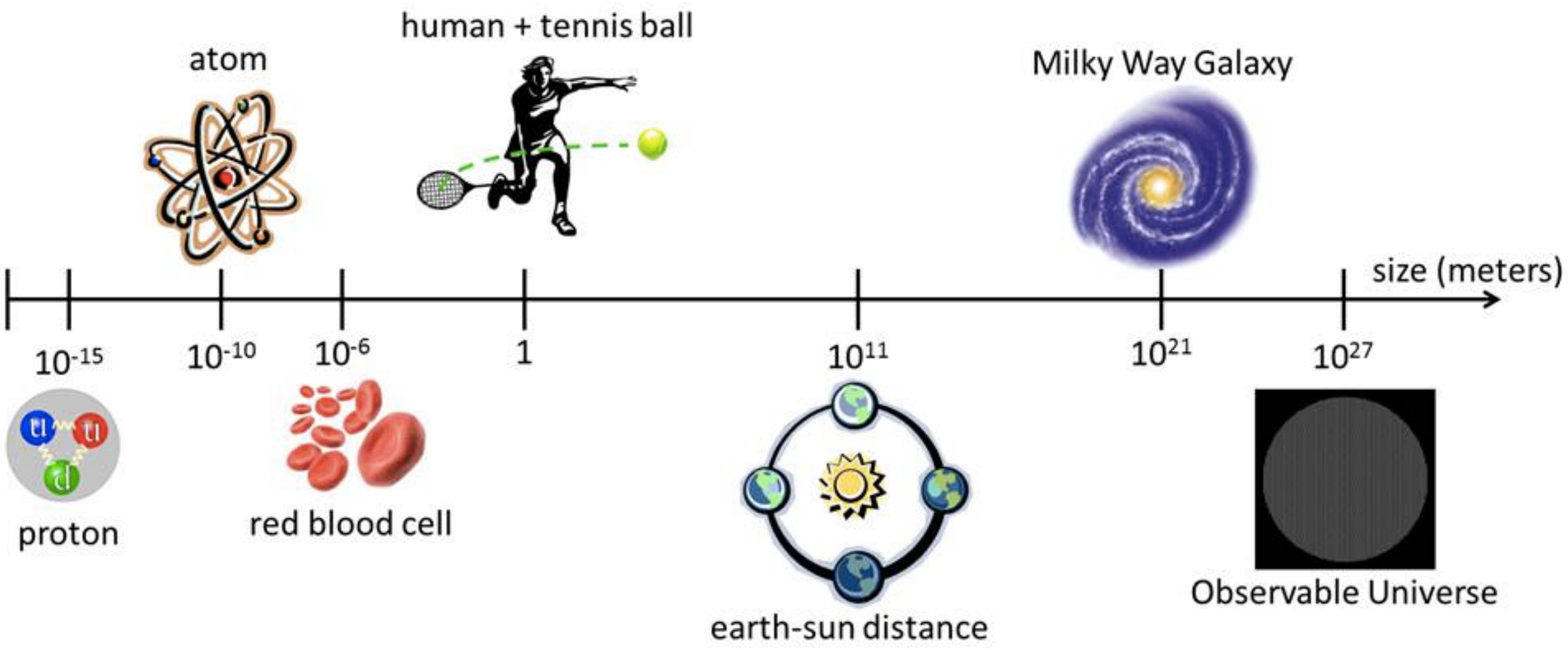
QUESTION: what is the smallest thing you can think of?

a small insect

a grain of salt

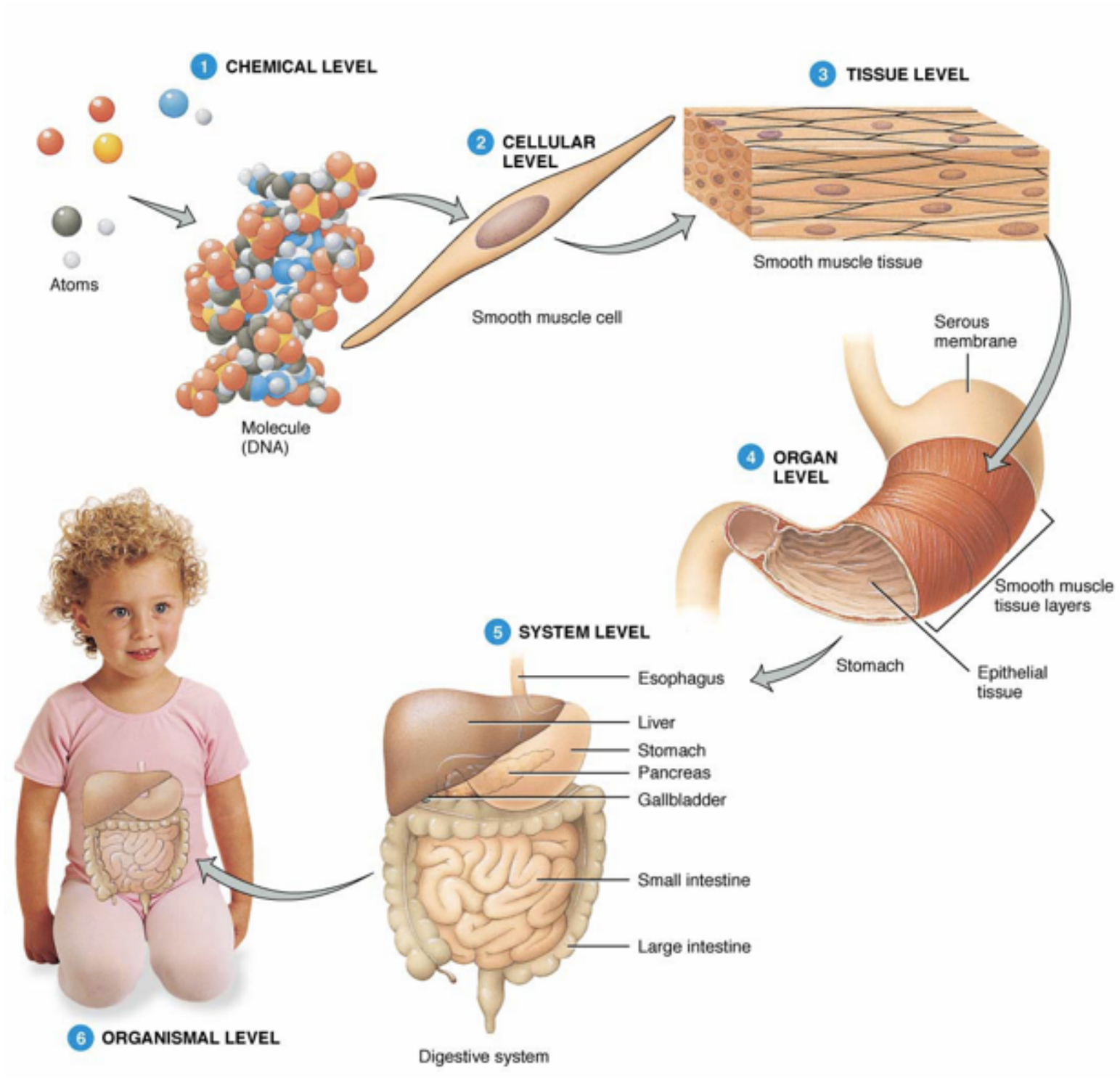
a bacteria

What is QUANTUM PHYSICS



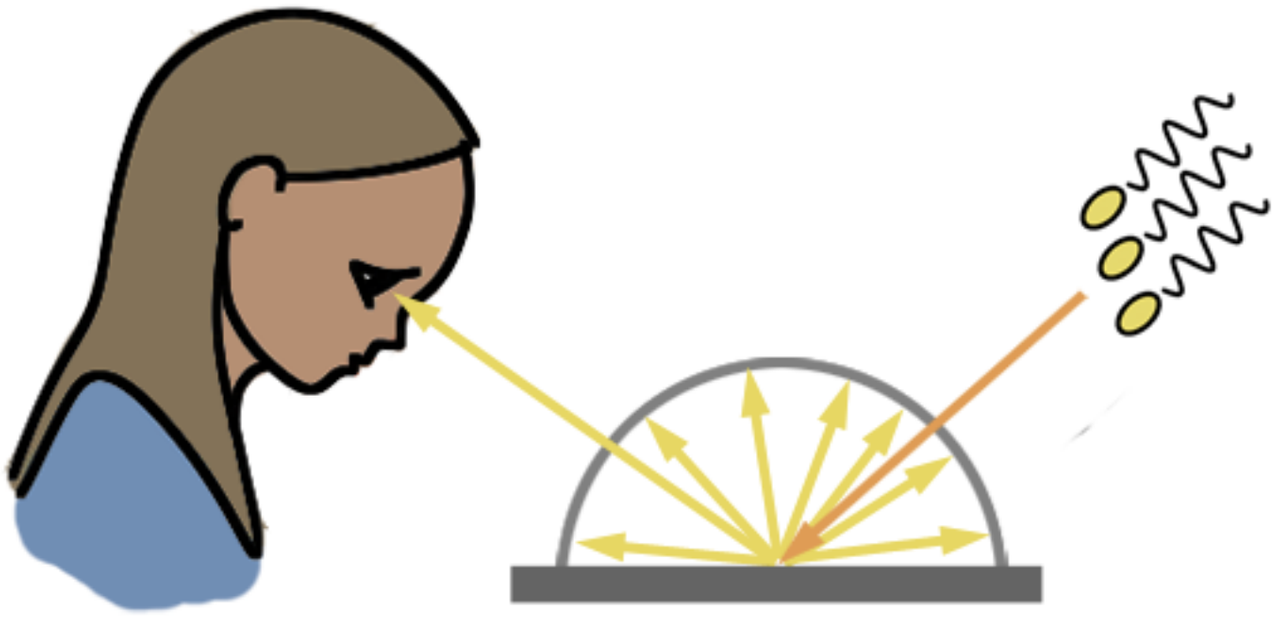
It's a matter of SIZE!

What is QUANTUM PHYSICS



WE ARE ALL MADE OF ATOMS!

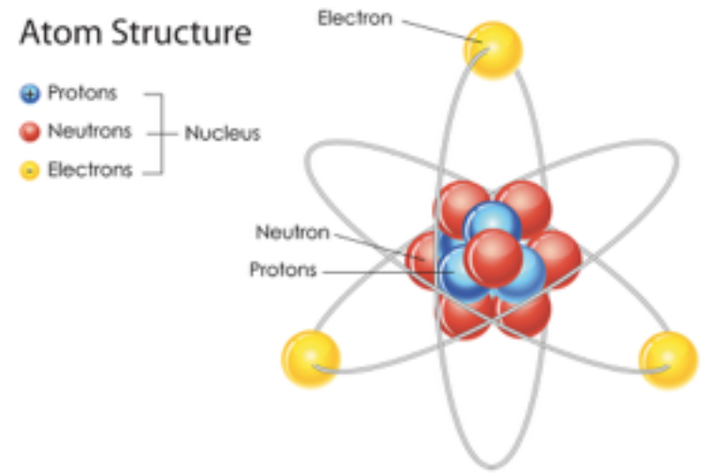
What is QUANTUM PHYSICS



WE CAN SEE THANKS TO PHOTONS!

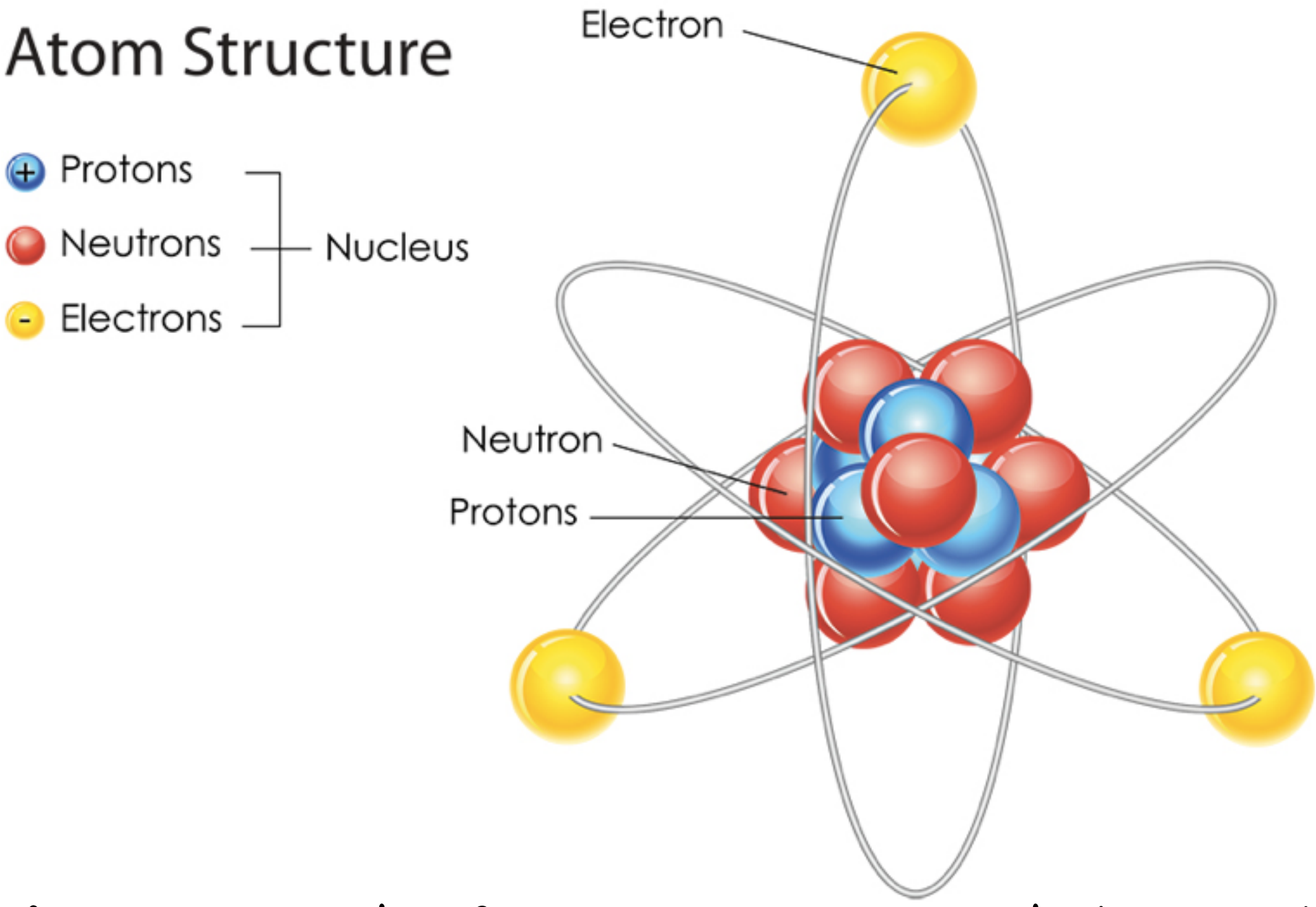
The smallest particles in the universe!

-Atoms: electrons, protons, neutrons



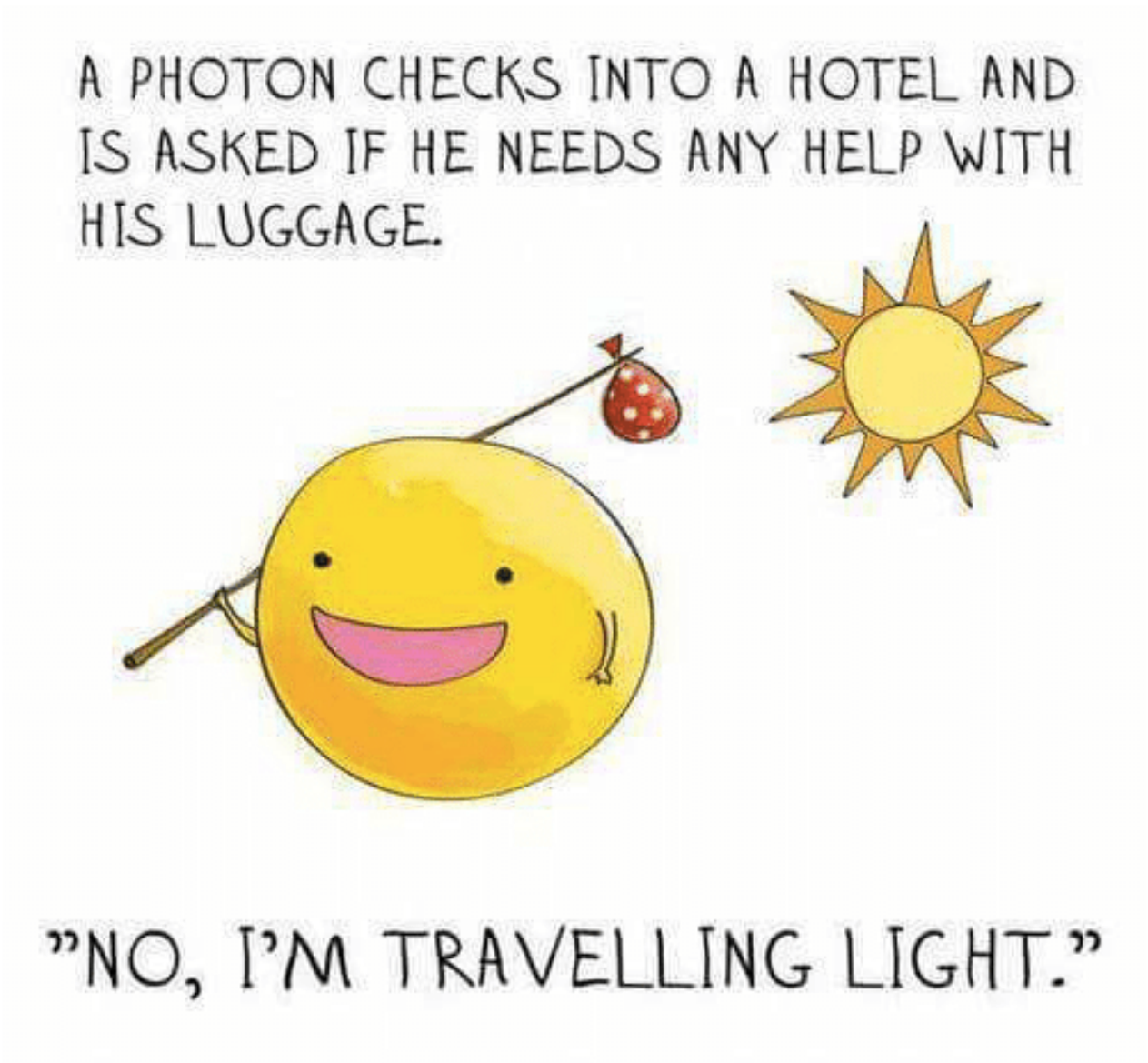
-Photons

The ATOM



Atoms are made of neutrons, protons and electrons!

The PHOTON



Photons have no mass and travel very fast!

The strange Laws of Quantum Physics

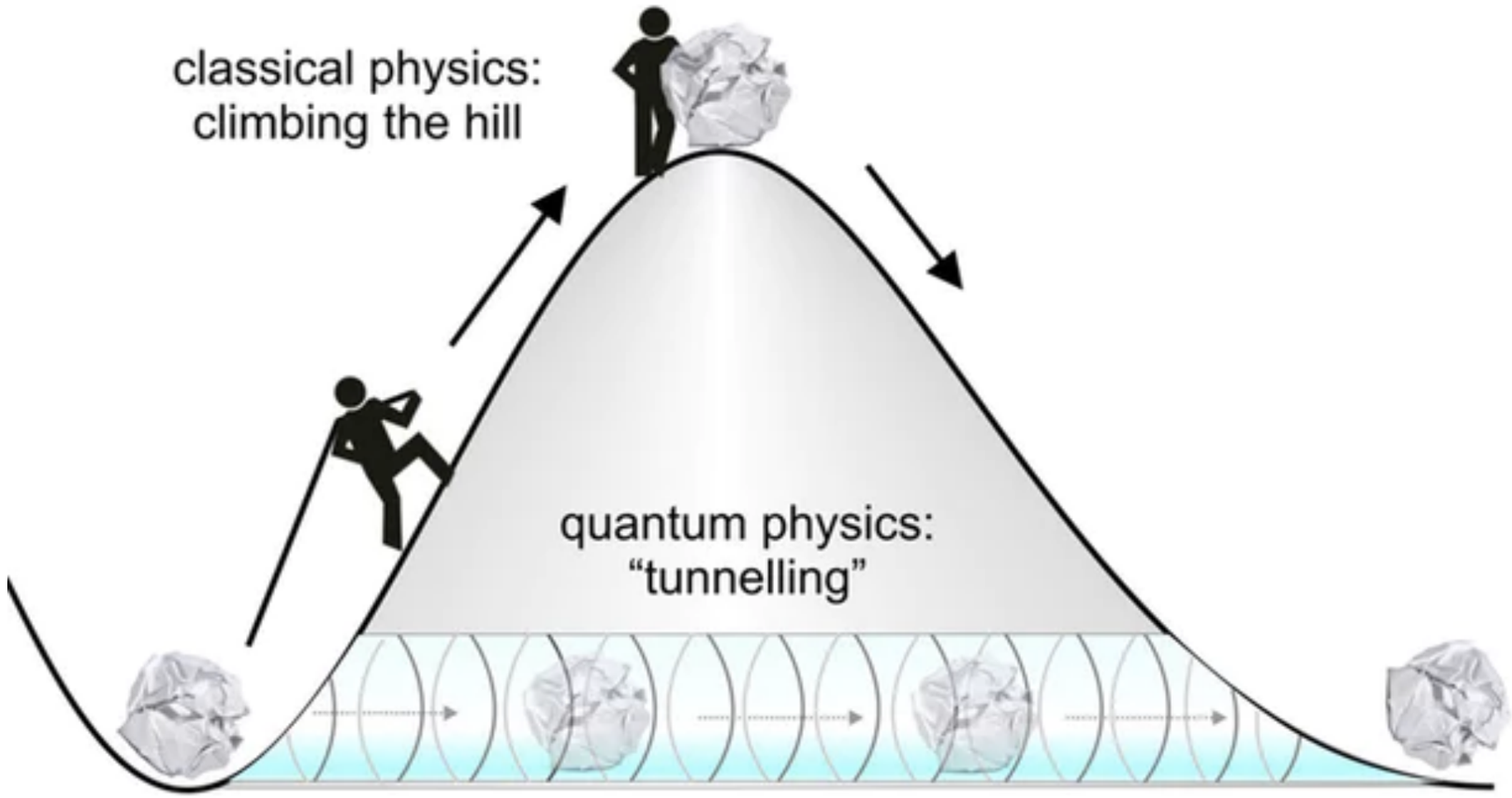
Small particles behave quite differently
from big ones (like us),
for us, their behaviour is rather
“strange”...

Two quantum behaviours are:

-Tunnelling

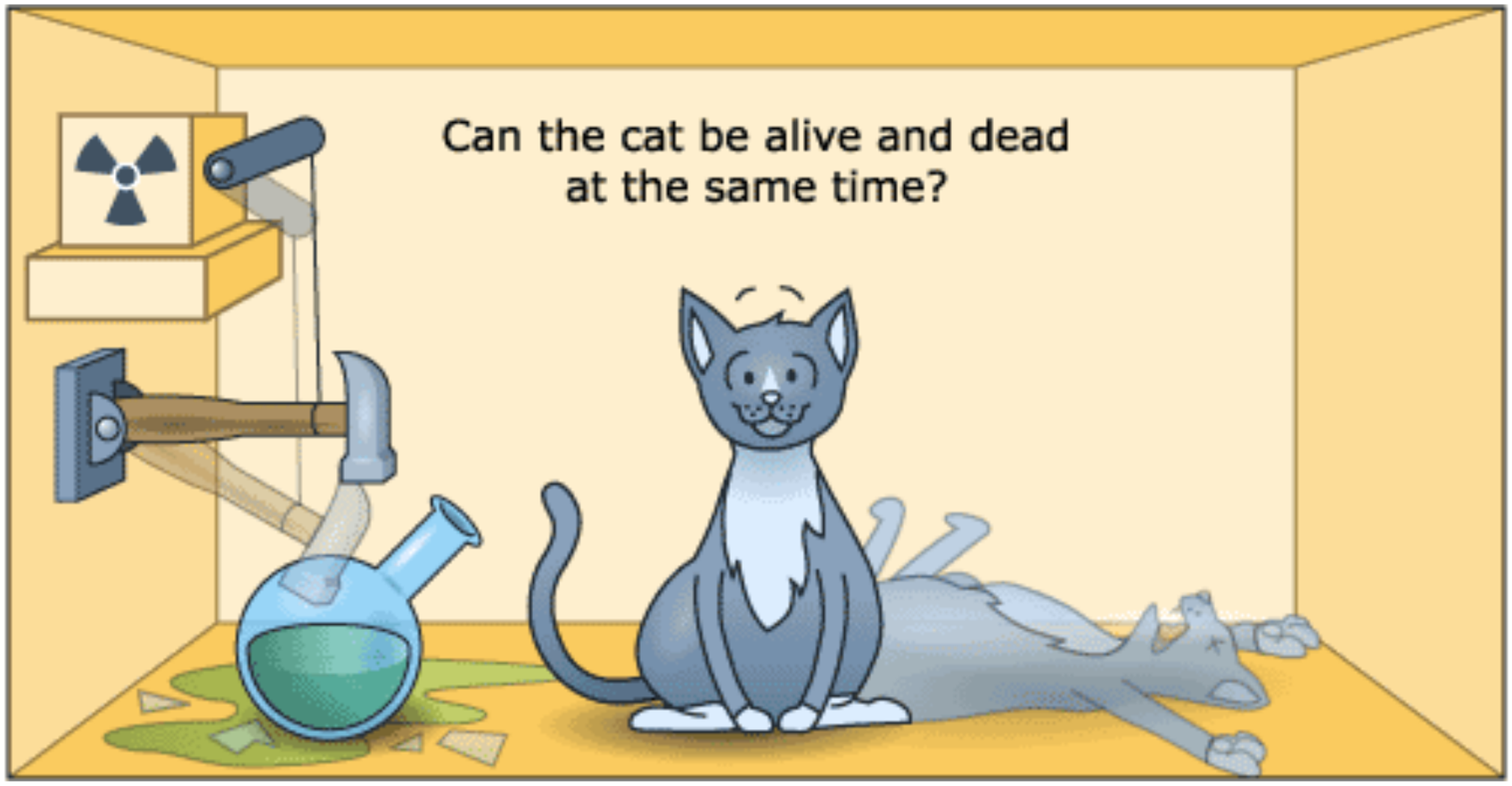
-Superposition

Tunnelling



When a quantum particle meets a high barrier, like a hill, it can just go straight through it! If you were an atom, you could pass through the wall!

Superposition

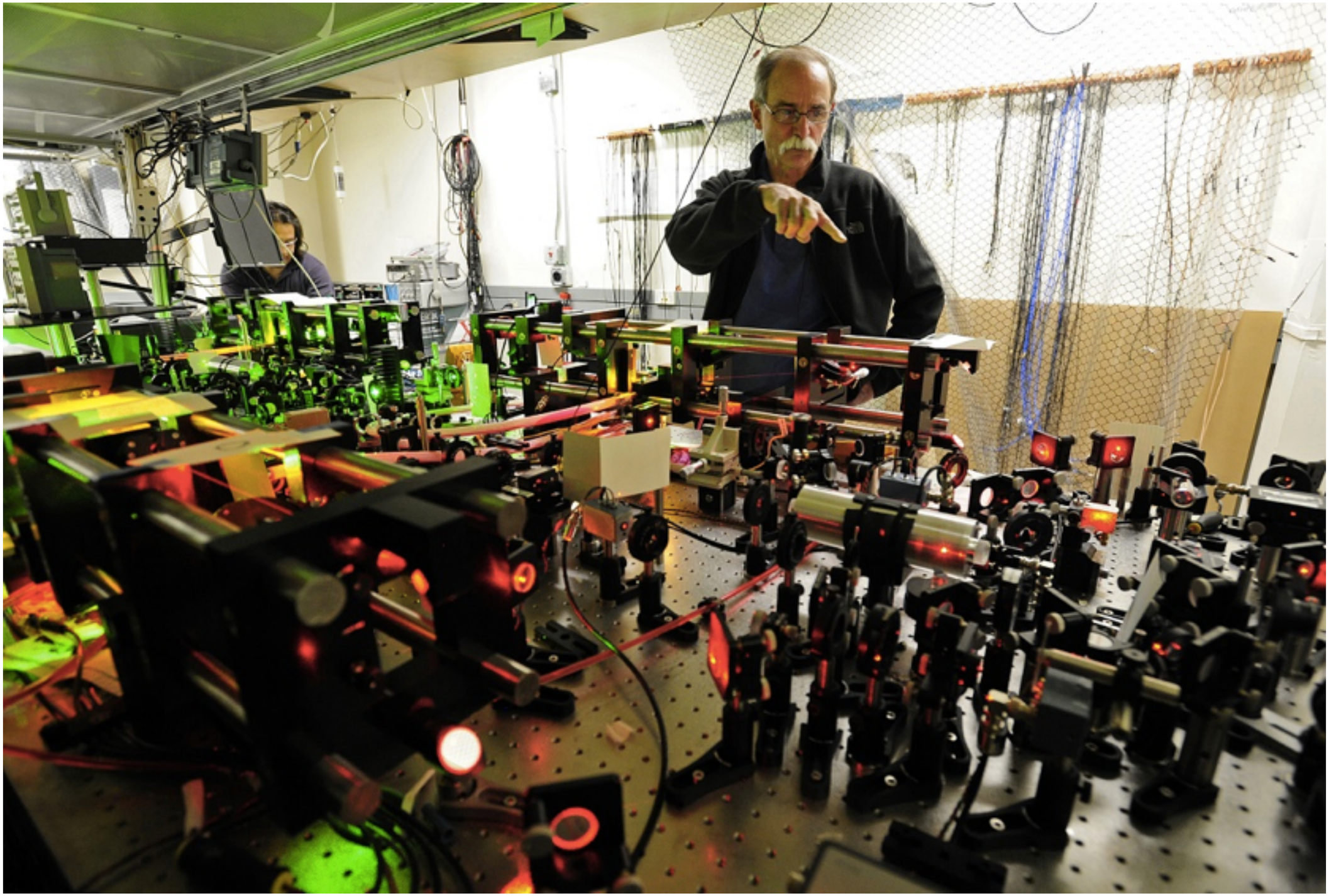


Atoms can be in different states at the same time! If a cat was an atom, he could be alive and dead at the same time!

How does a quantum scientist look like?

They do many calculations, and think a lot..

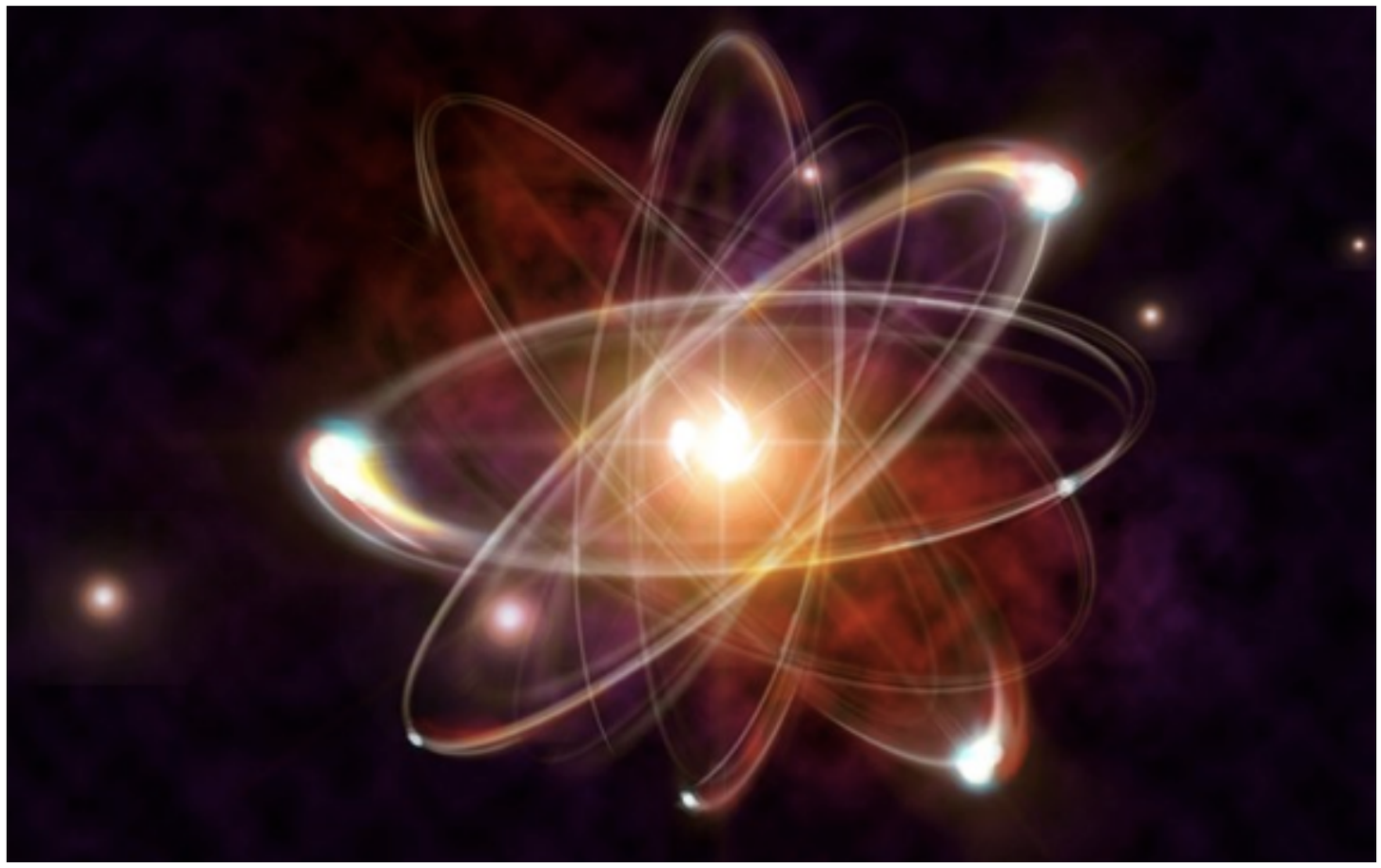
How does a quantum scientist look like?



They spend a lot of time in the laboratory

Final activity

Write a story or make a drawing of your favourite quantum particle!



Conclusion: what have we learnt today?

- Quantum Physics describes the smallest particles in the universe
- Quantum physics is all around us, we are made of atoms, and we can see thanks to photons!
- Atoms, made of electrons, protons and neutrons, and photons are the building blocks of the universe.
- Quantum particles follow laws that are different from our everyday intuition: they can tunnel and superimpose!

Resources for the teacher

https://www.symmetrymagazine.org/article/eight-things-you-might-not-know-about-light

https://www.zmescience.com/science/what-is-photon-definition-04322/

https://en.wikipedia.org/wiki/Quantum_mechanics

http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html