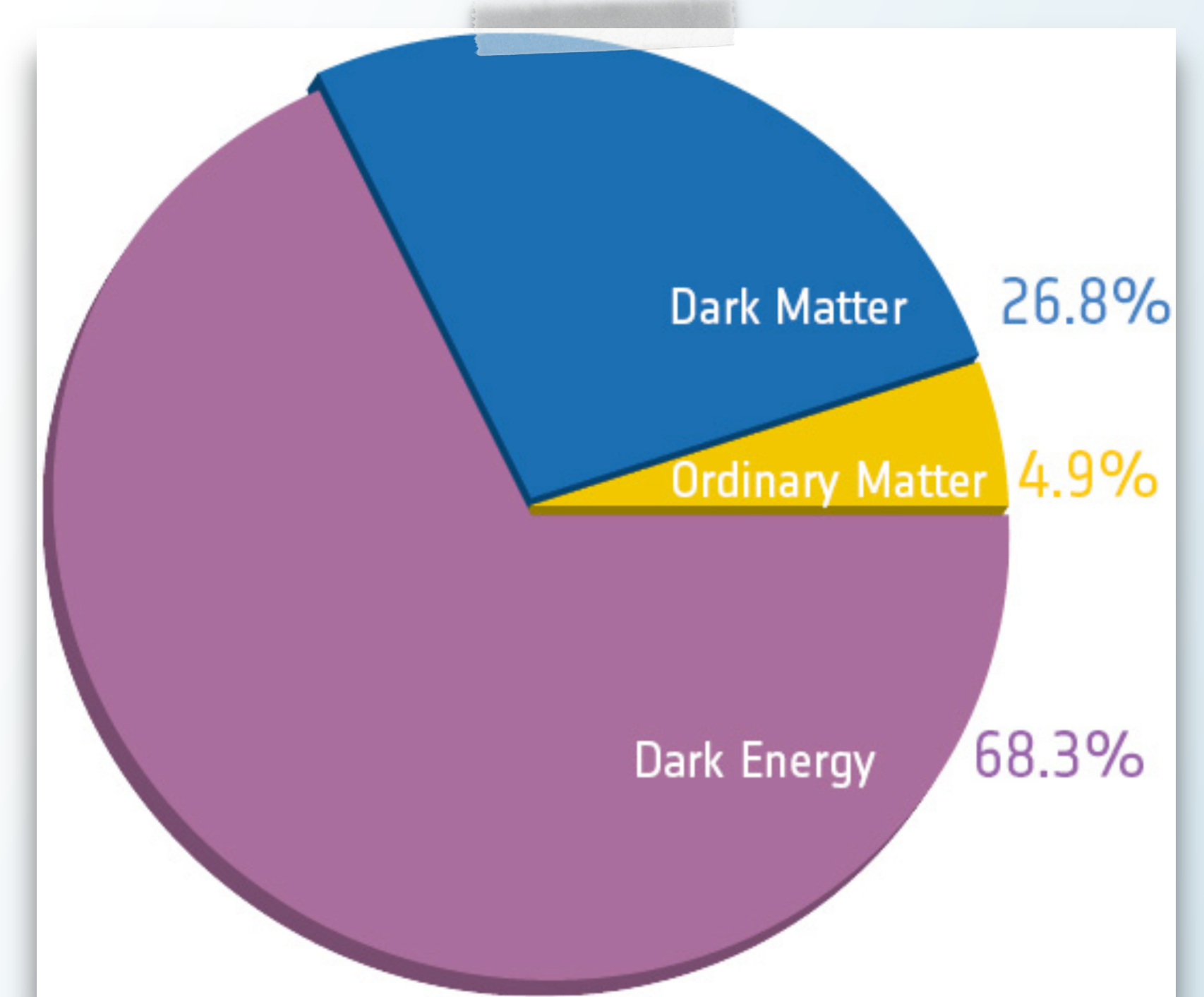
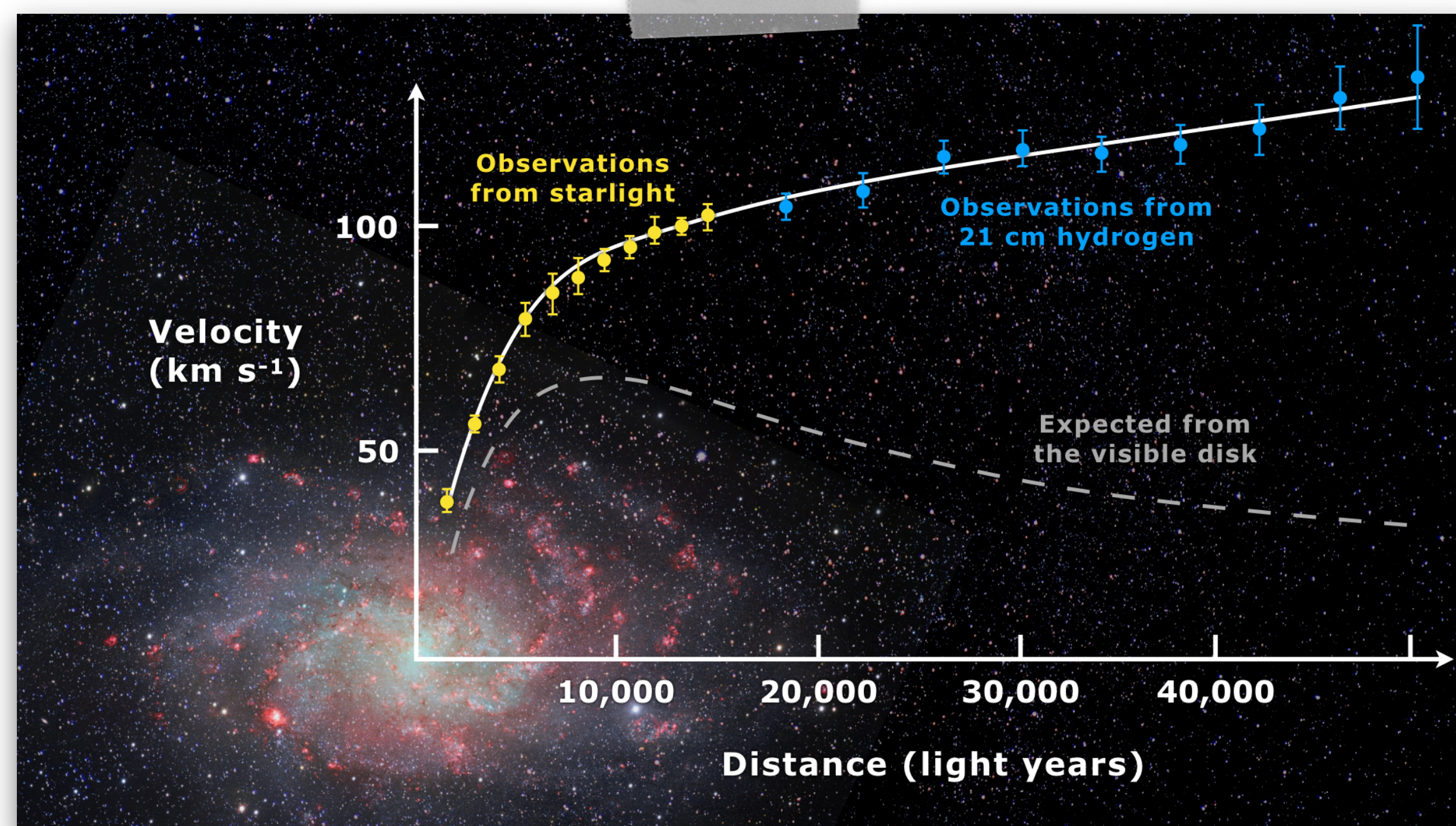


The dark Universe

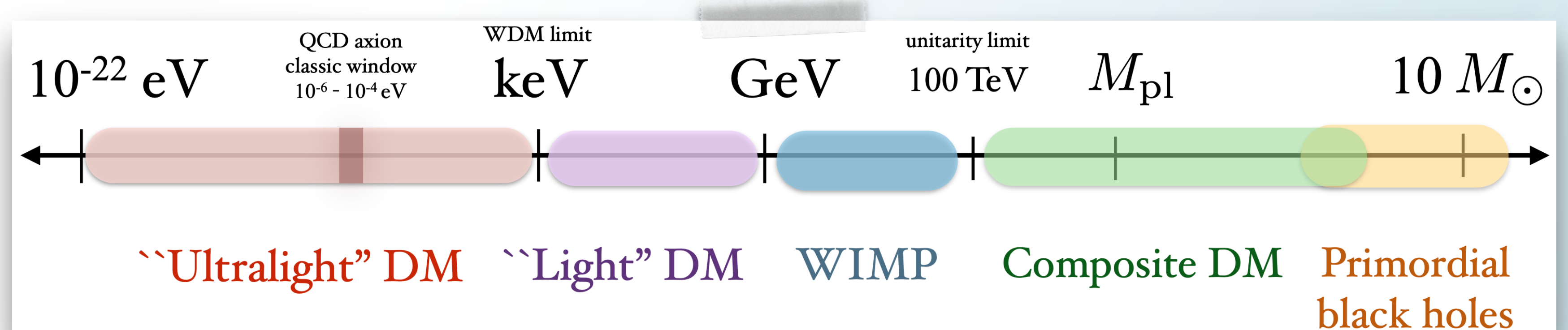
INFN gruppo 4 Roma 1

About 85% of the matter in the Universe is **dark matter**: its interaction with ordinary matter (us!) is so far only gravitational.

Observational evidence for dark matter is all over the place!



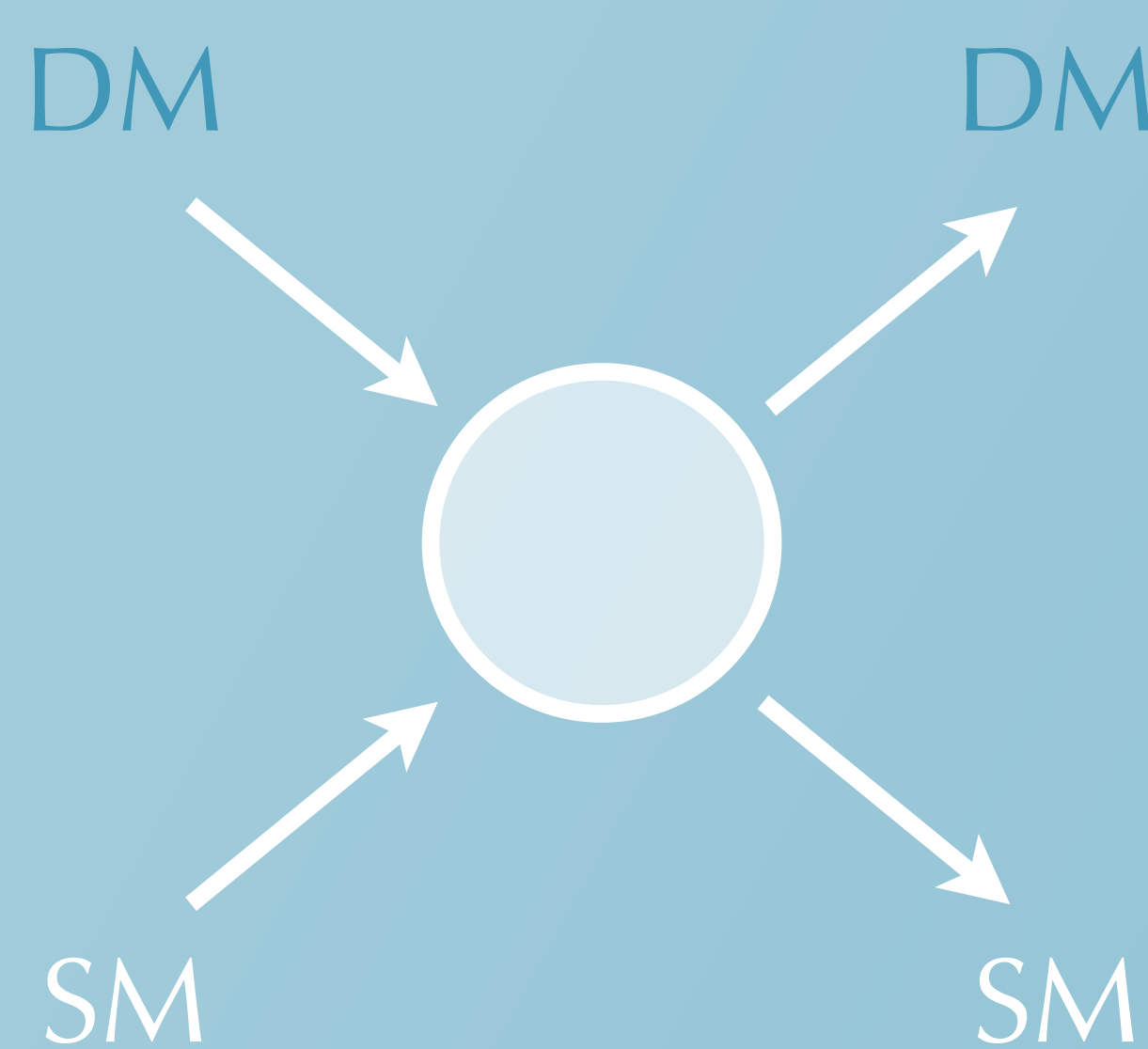
But **we know very little** about its nature... How can we learn more?



Direct detection

If dark matter has non-gravitational interactions, we can **hunt it in the lab**

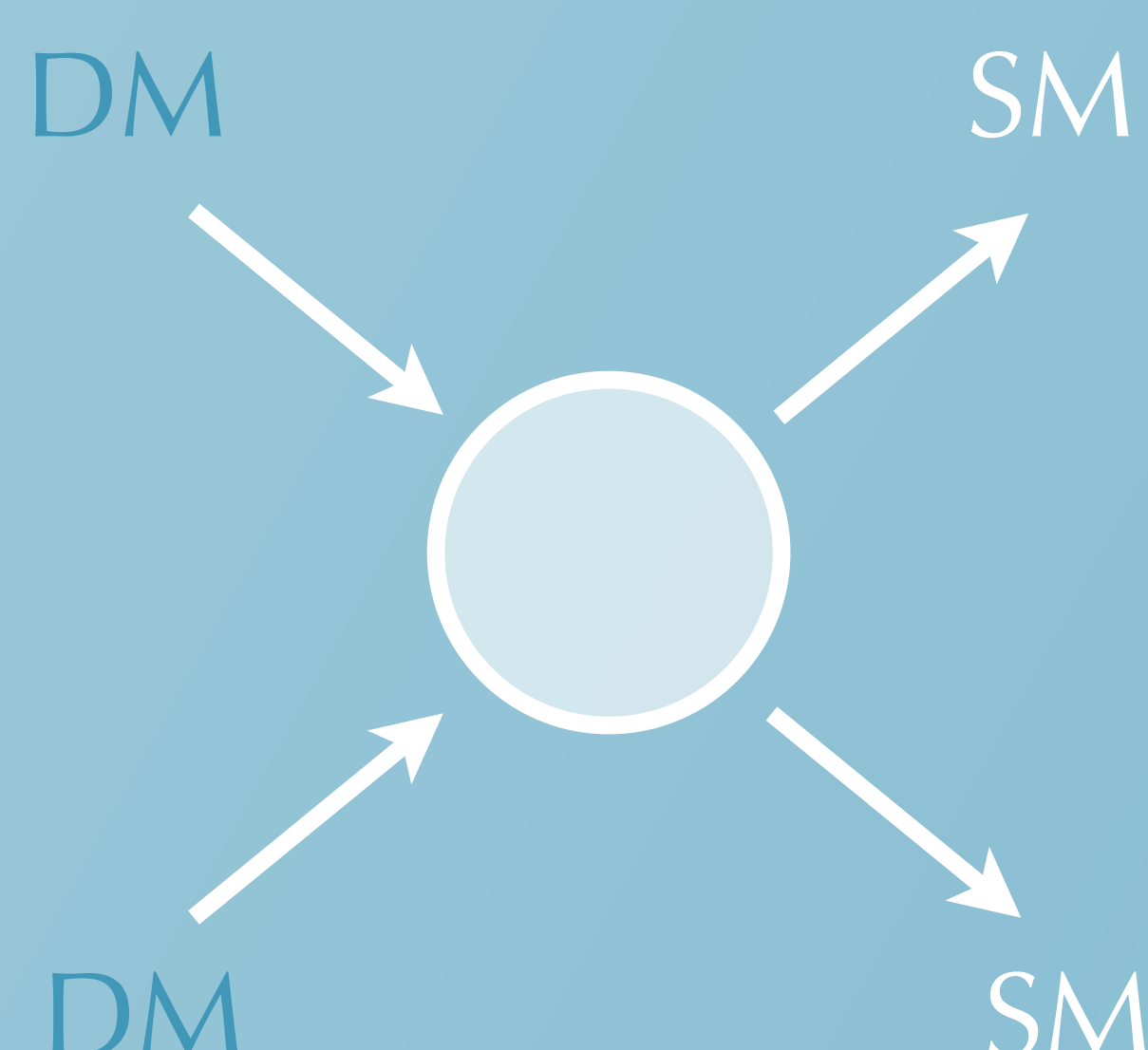
- collider searches
- noble gases
- quantum materials
- collective modes
- ...



Indirect detection

Dark matter interactions can cause **unexpected astrophysical phenomena**

- antimatter production
- high energy neutrinos
- black hole physics
- ...



Cosmological bounds

Dark matter was present at the very **beginning of the Universe**.

What's left today?

- cosmic microwave background
- distribution of galaxies in the sky
- Big Bang nucleosynthesis
- ...

