DYNAMICAL FRICTION IN FUZZY DARK MATTER UNIVERSE

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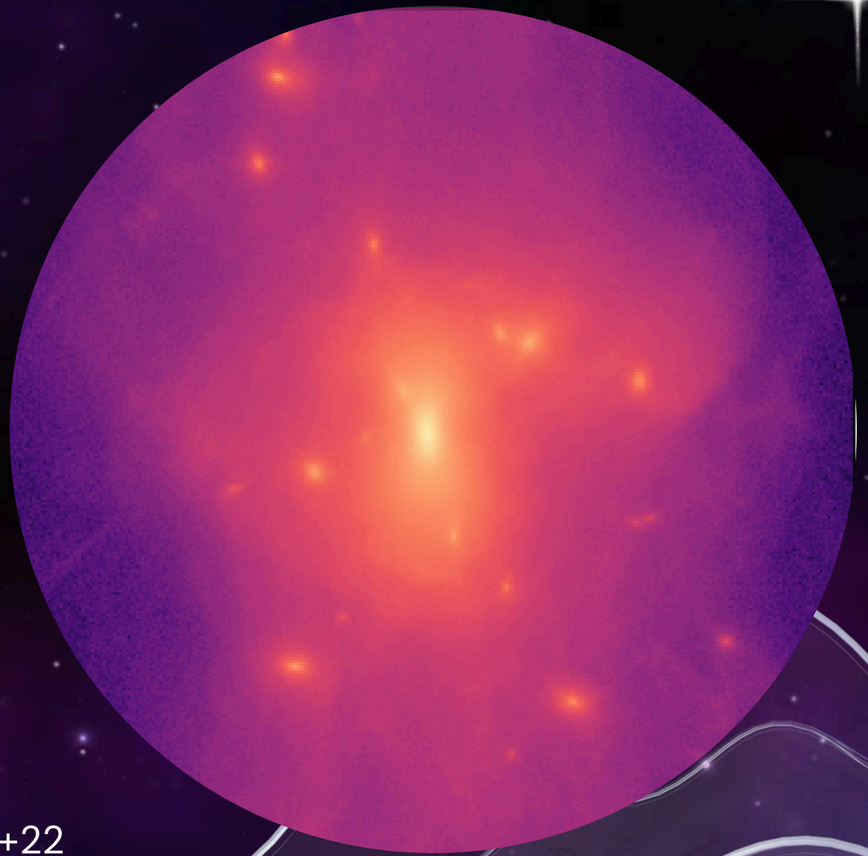
AG LIRA 18/06/2025

M1 internship supervised by P.Boldrini

Dark Matter models

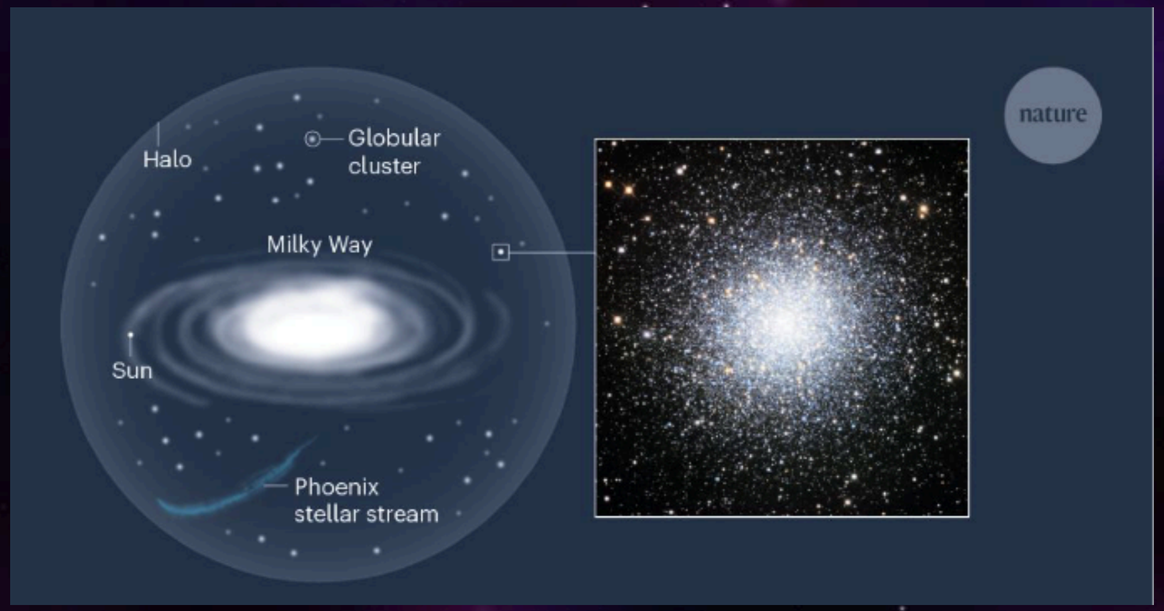
Cold Dark Matter

Fuzzy Dark Matter



Credits: Nori+22

Globular clusters



Credits : Nature

- Very dense objects composed of millions of stars
- Globular clusters are orbiting within galaxies
- **171 globular clusters in the Milky Way** (Gaia collaboration +18, +21, Vasiliev & Baumgardt+21)

Dynamical Friction

Energy loss mechanism

→ **Acts on all very massive objects in the galaxy** (globular clusters, black holes, galaxy satellites, etc.)

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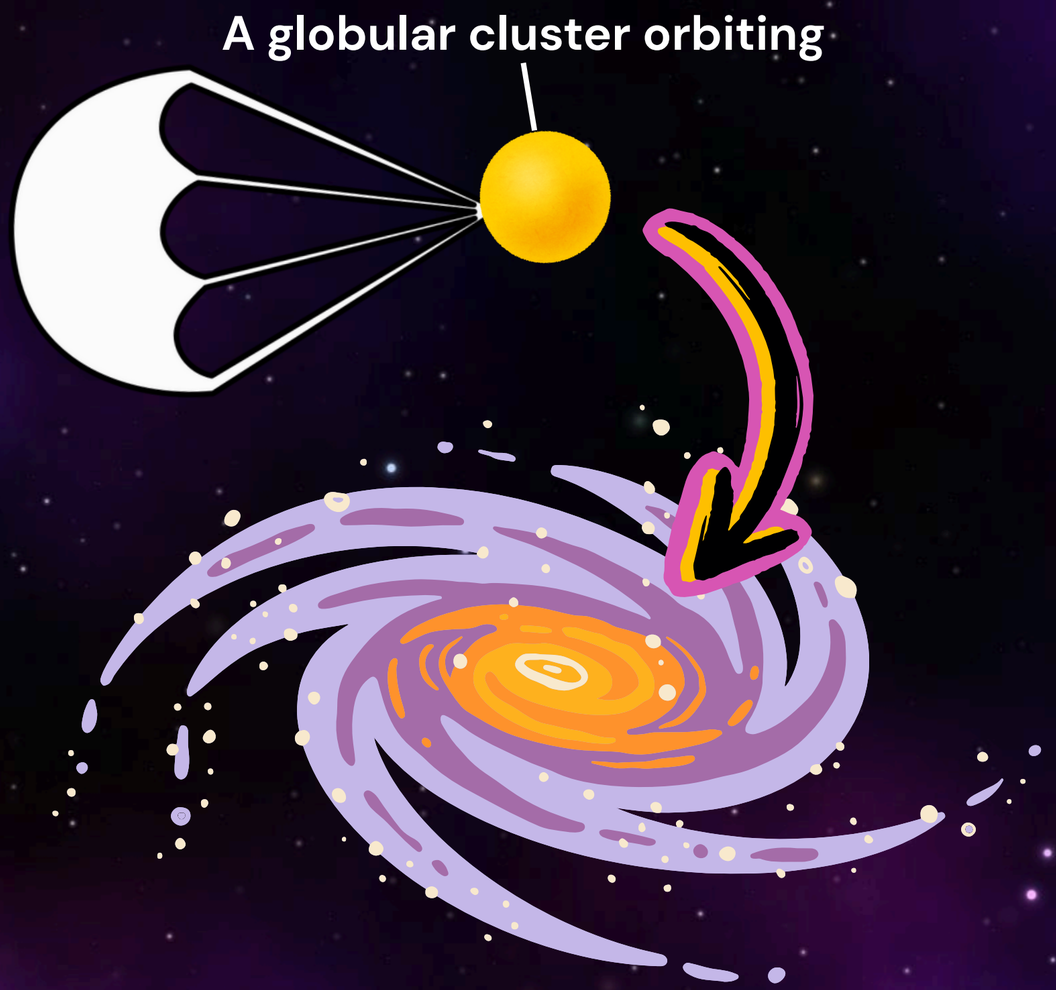


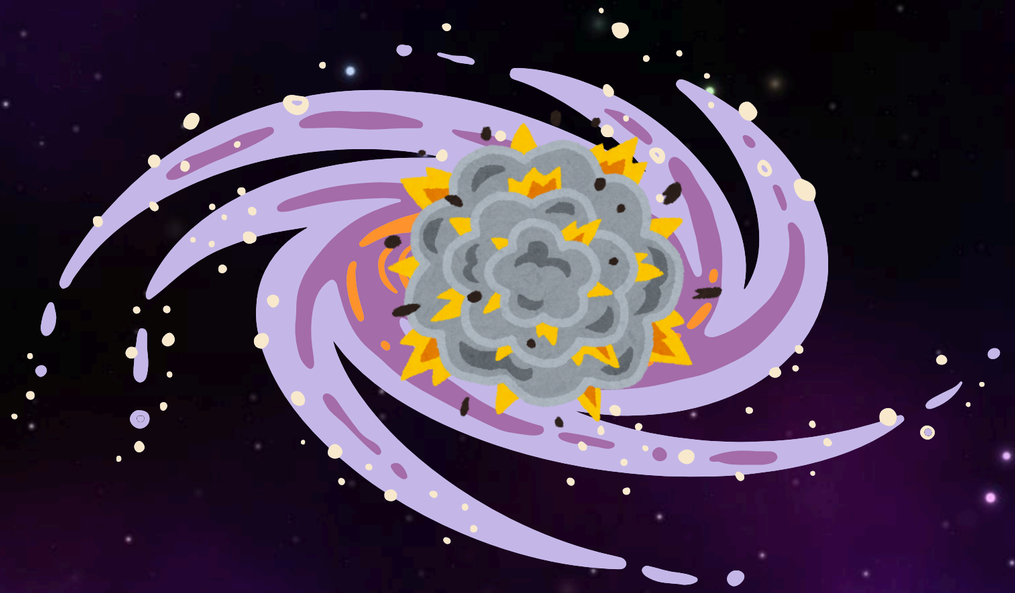
Dynamical Friction

Energy loss mechanism

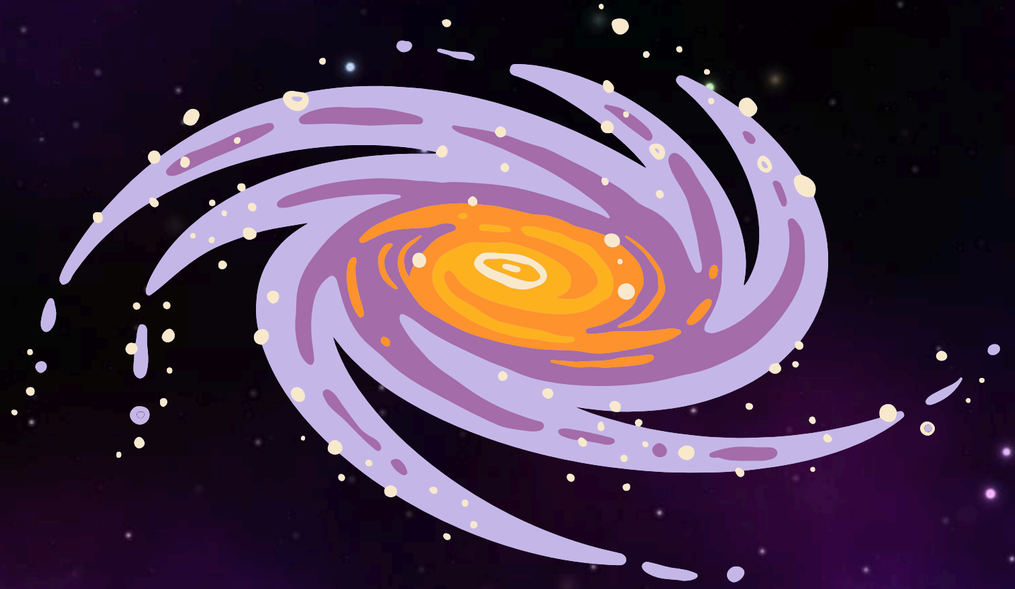
→ **Acts on all very massive objects in the galaxy** (globular clusters, black holes, galaxy satellites, etc.)

→ **The globular cluster is slowed down...**

→ **... and falls to the center**

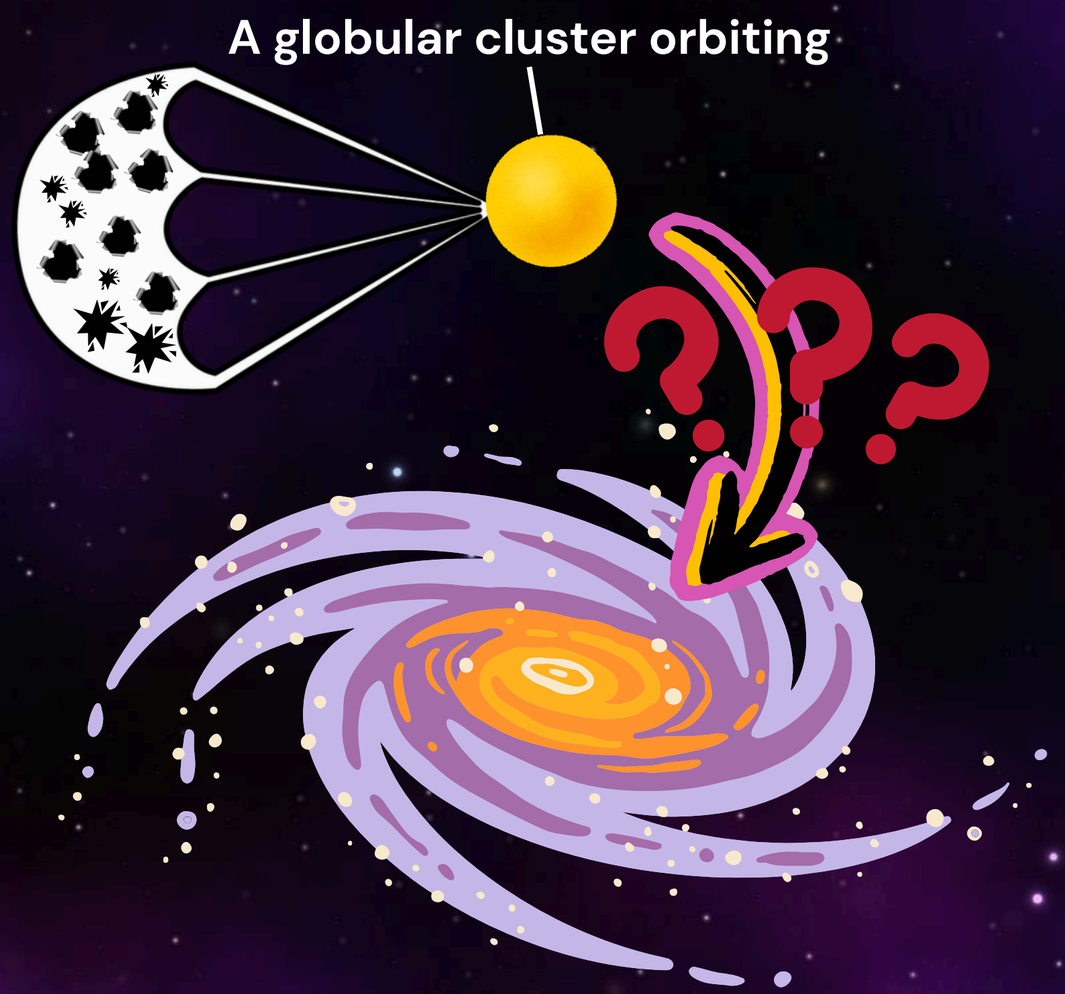


Dynamical Friction in Fuzzy Dark Matter ?



Dynamical friction in FDM is like holes in the parachute

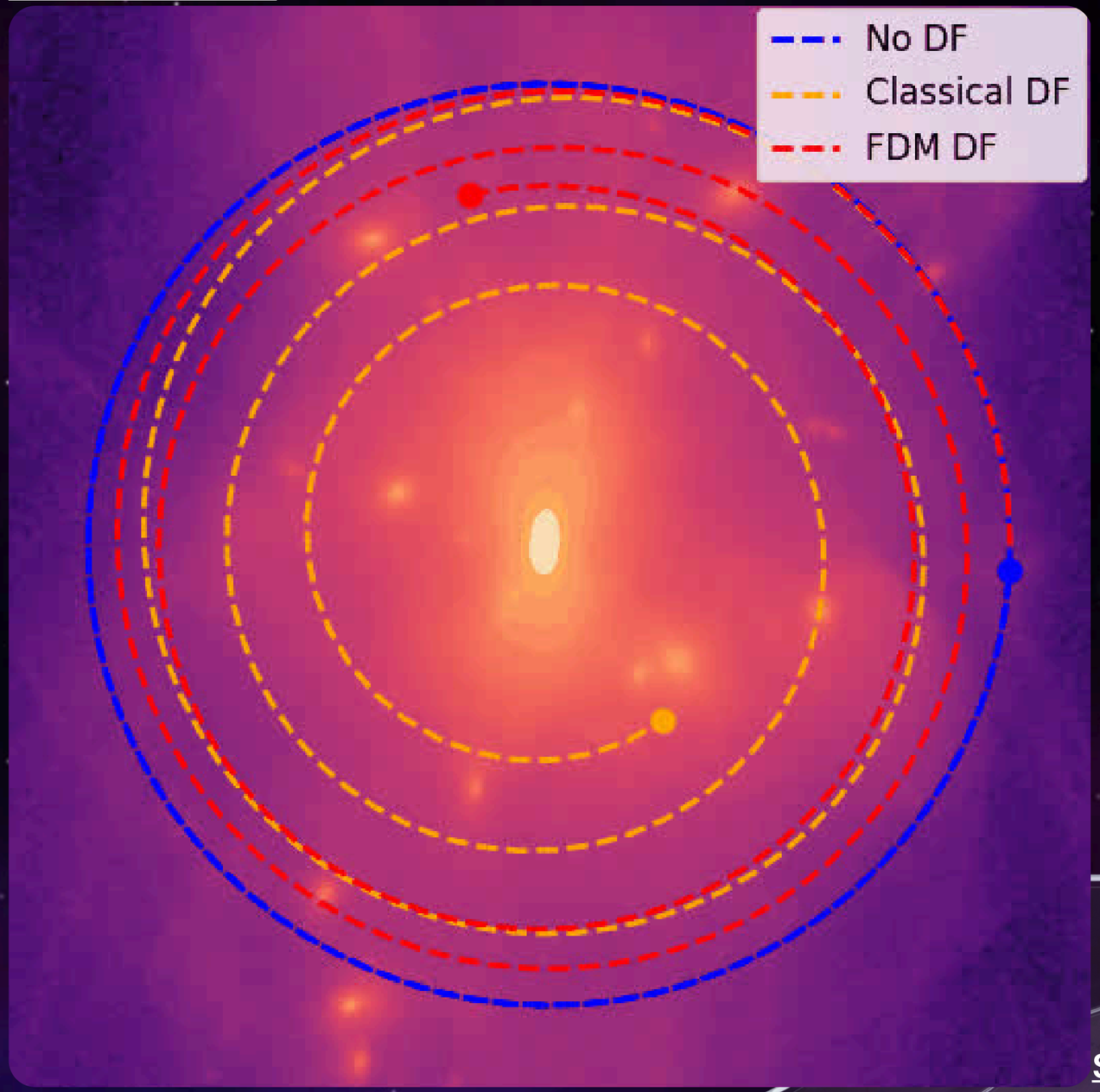
Dynamical Friction in Fuzzy Dark Matter ?



Dynamical friction in FDM is like holes in the parachute

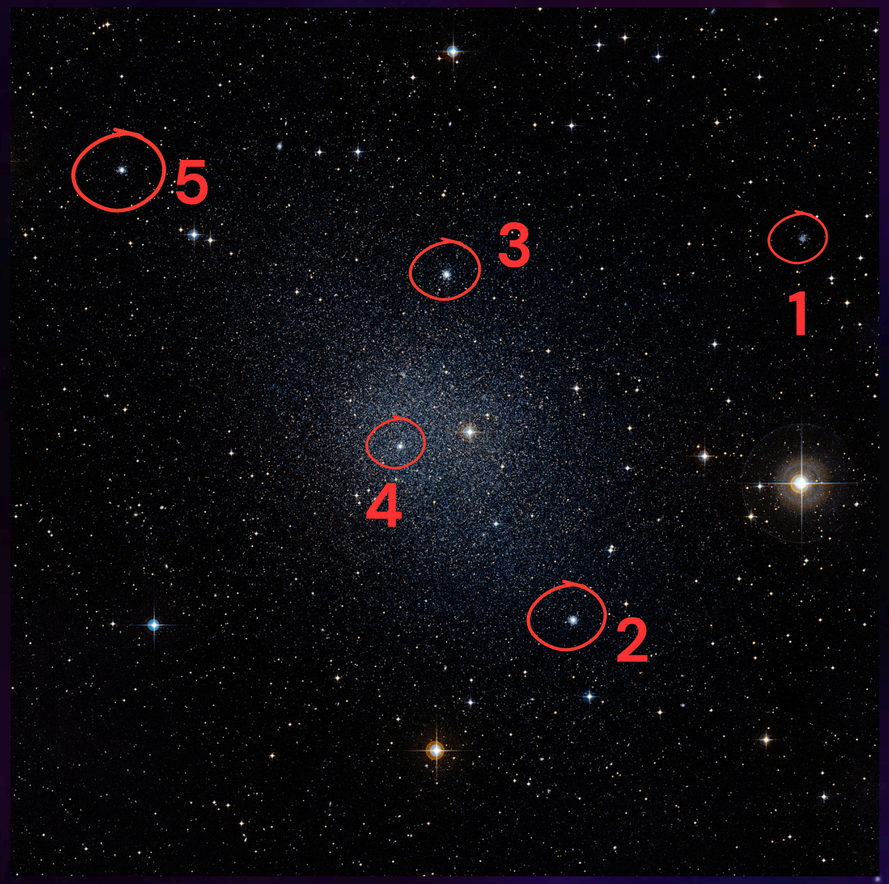
What will be the fate of the globular cluster ?

Click to animate



See animation

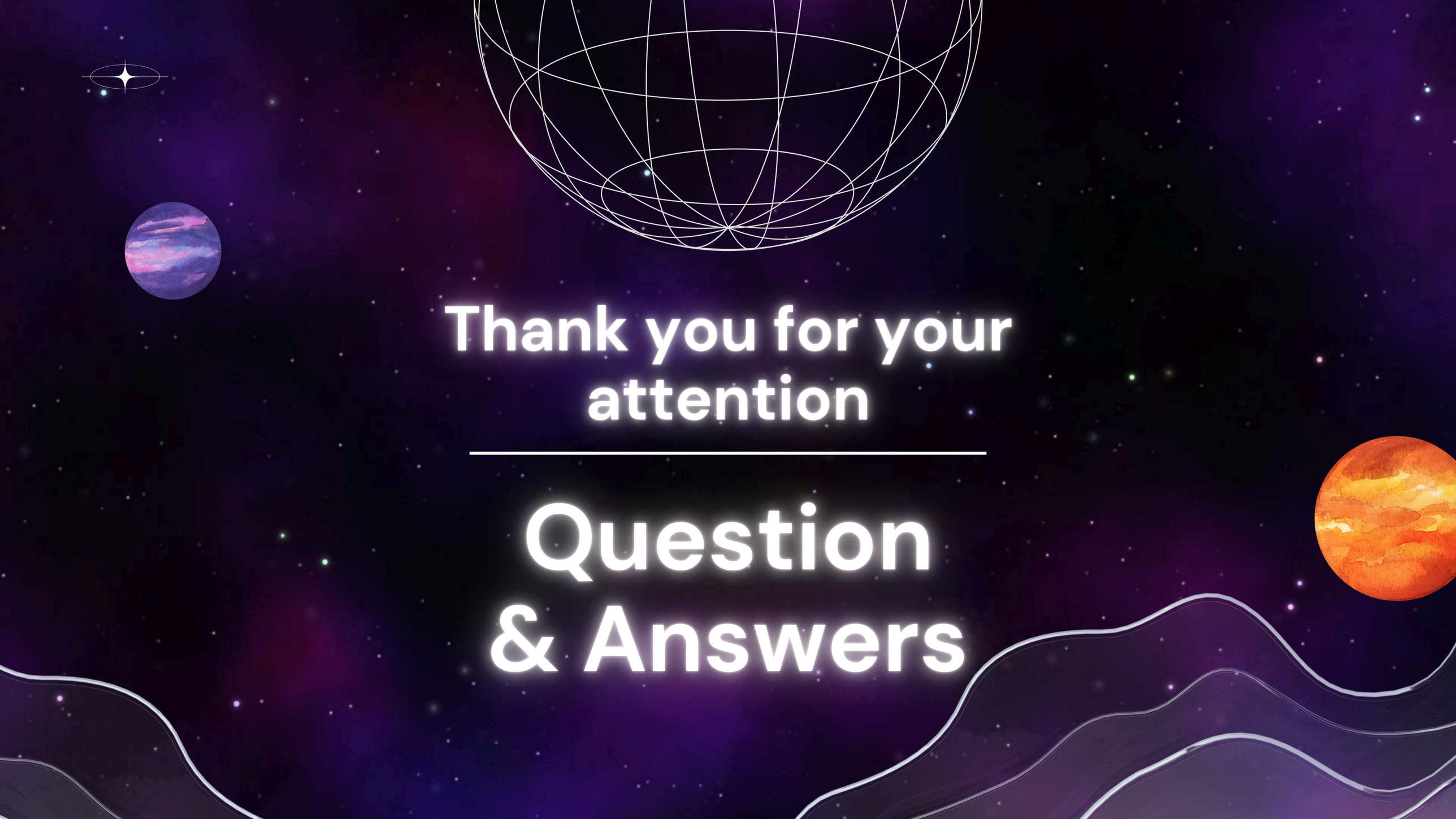
Fornax Dwarf Galaxy



Crédits : ESO/Digitized Sky Survey 2

Fornax is older than 10 billion years !

	Fall-in time in CDM (in billion years)	Fall-in time in FDM (in billion years)
GC n°1	25	209
GC n°2	2.6	29
GC n°3	0.24	11
GC n°4	0.15	18
GC n°5	5.12	38


Thank you for your attention
Question & Answers