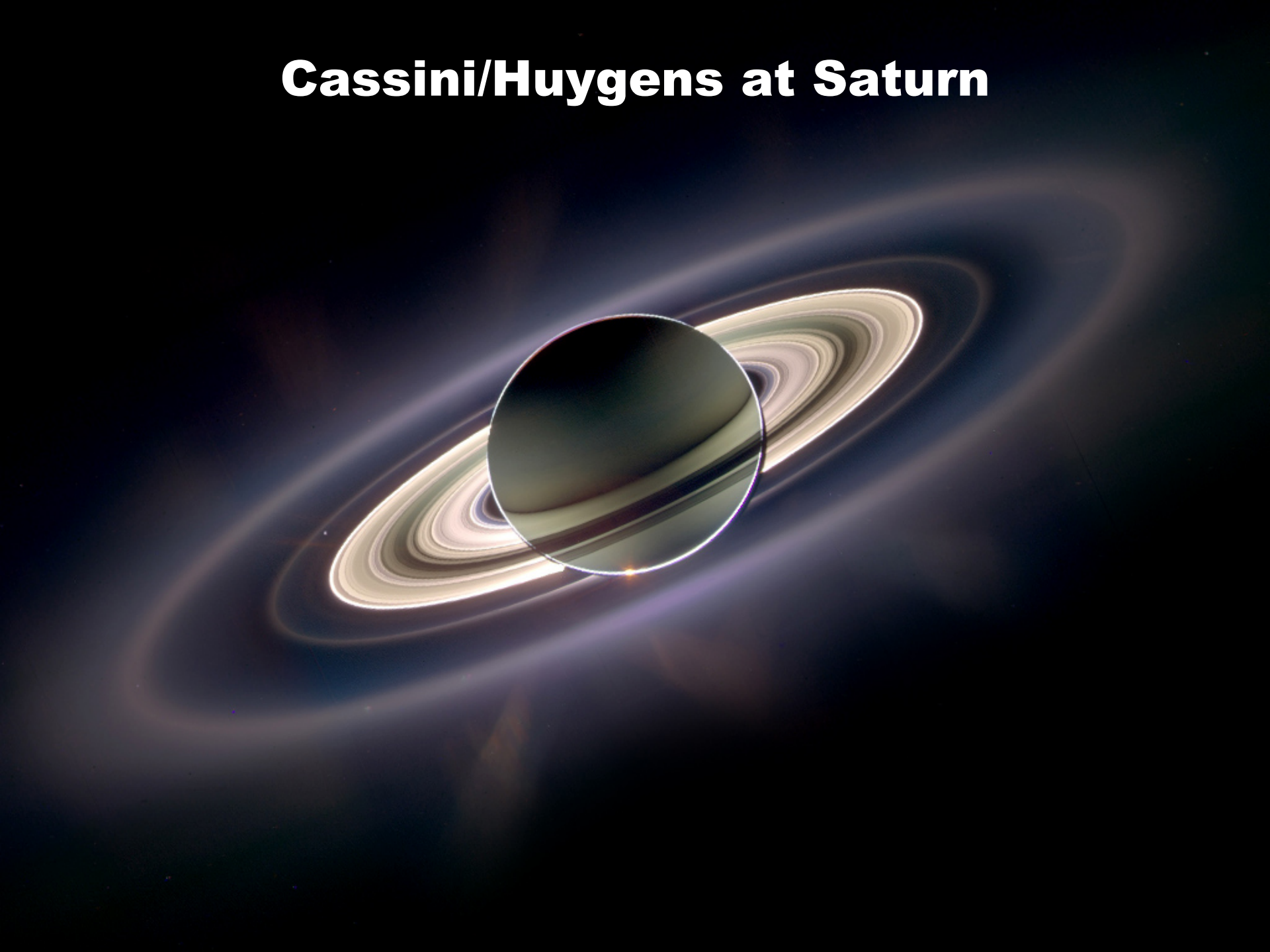
Brief CV – Michele Dougherty

- Born and brought up in South Africa
- Did not do science at school
- BSc (Hons) and PhD, University of Natal, Durban, SA

- 2-year fellowship at Max Planck Institute in Heidelberg, Germany
- Joined Imperial as post-doc on 2 year contract in 1991

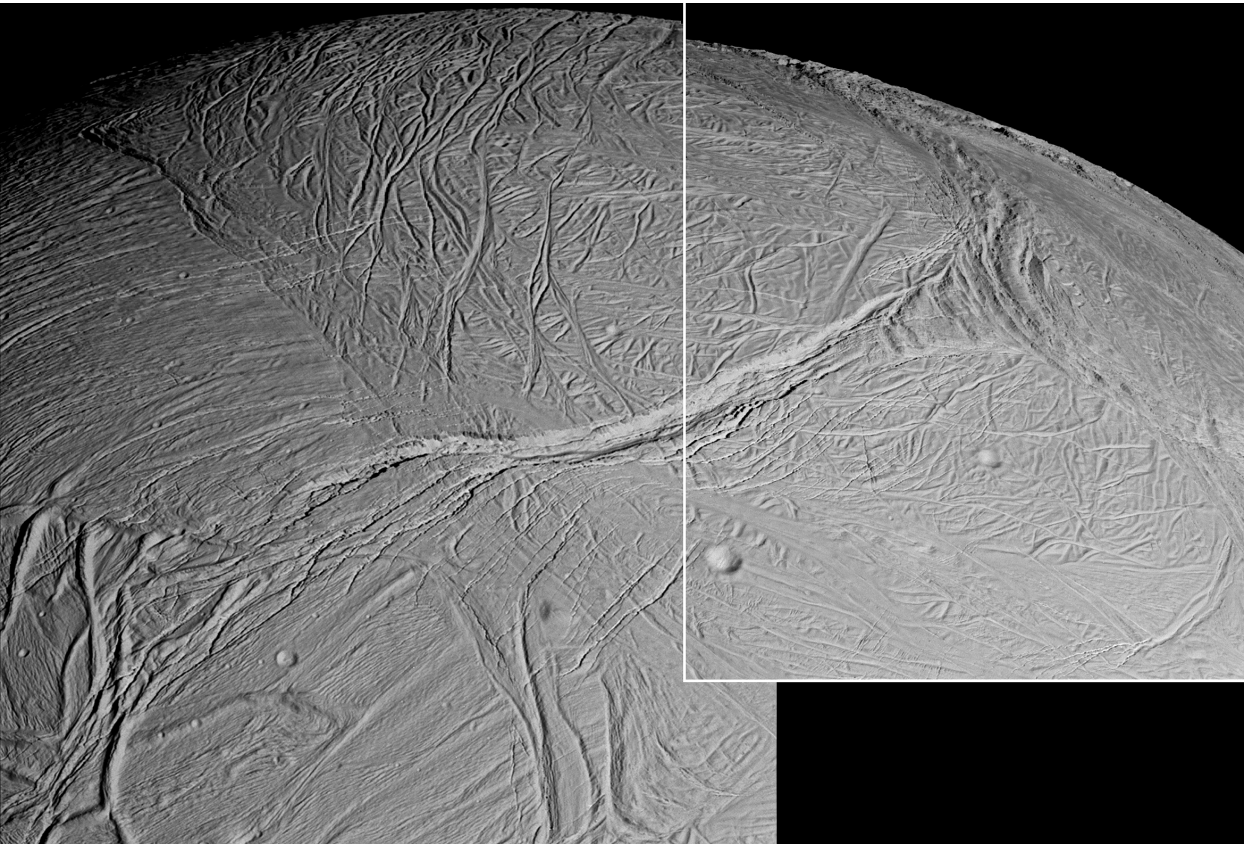
- Cassini Magnetometer Principal Investigator (PI)
  - Discovered water vapour plume at Enceladus (heat source, liquid water, organic material)
  - End of mission September 2017
- JUICE Magnetometer PI, launch June 2022, arrival at Jupiter in November 2029
- Became Head of Physics Department in January 2018

Cassini/Huygens at Saturn




Belgium
France
United States
Germany
Denmark
Italy
Israel
United Kingdom
Poland
Netherland
Czech Republic
Austria
Spain
Finland
Switzerland
Ireland
Sweden
Norway
International
Participation in
CASSINI
Saturn Orbiter and
Huygens Titan
Probe

Enceladus



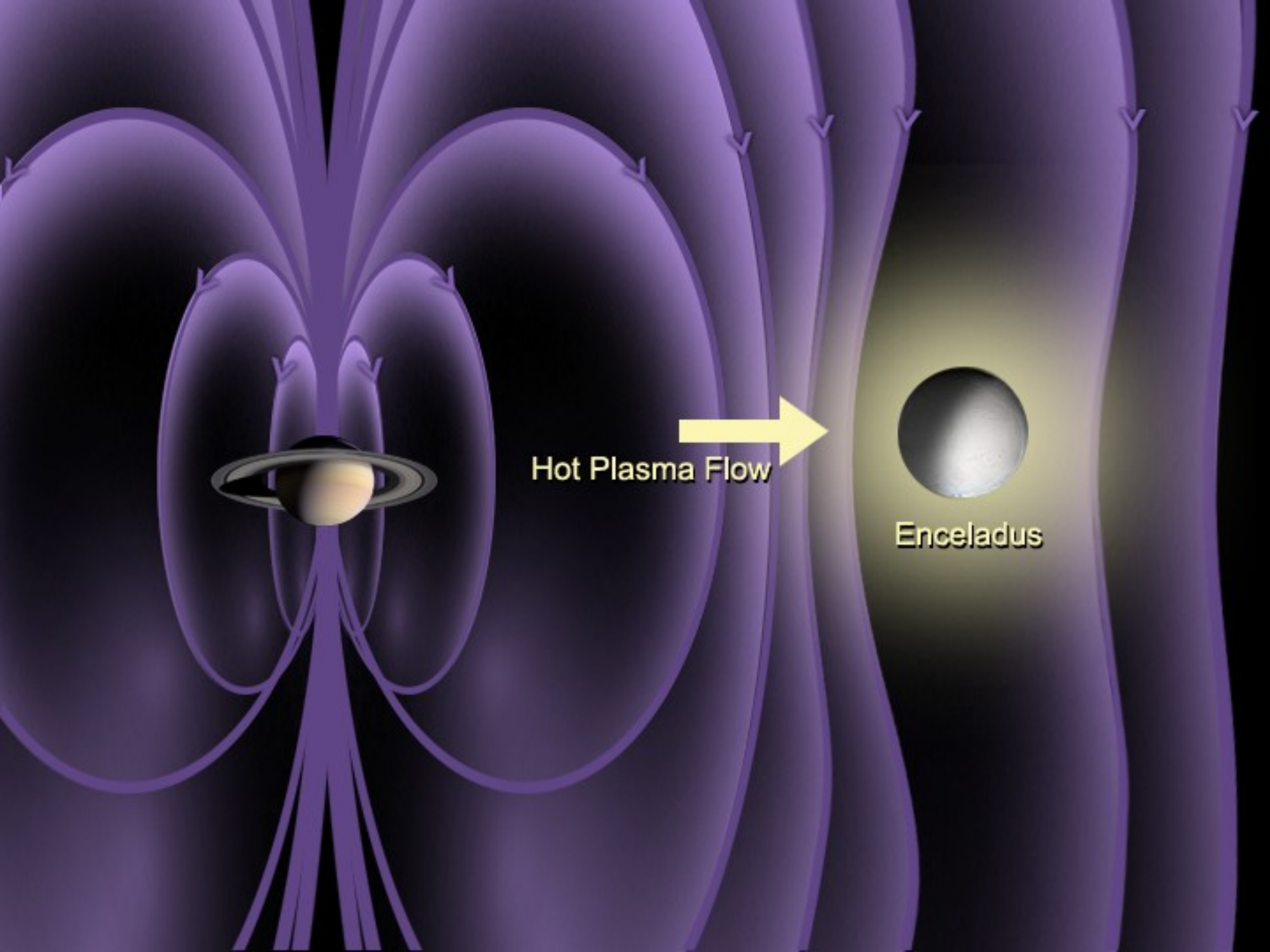
Three Cassini flybys
(1265km, 500km, 173km)

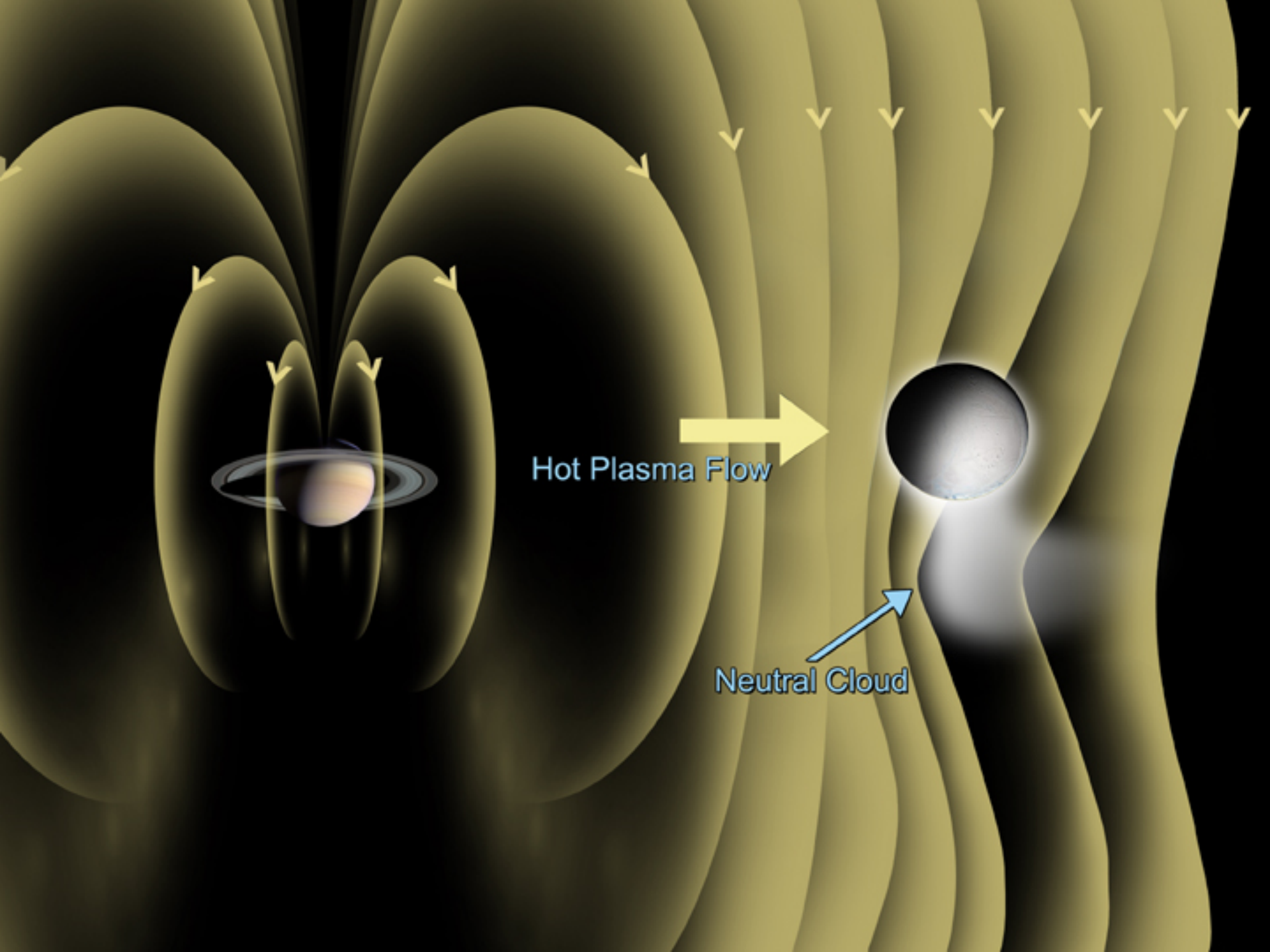
In inner magnetosphere

Source of Saturn's E ring?

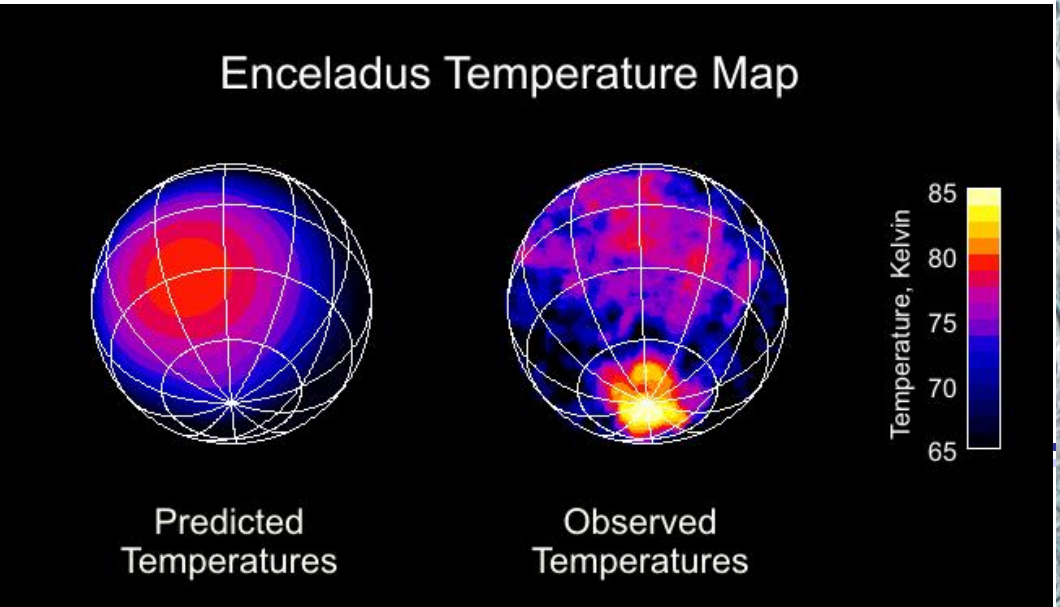
Relatively young surface

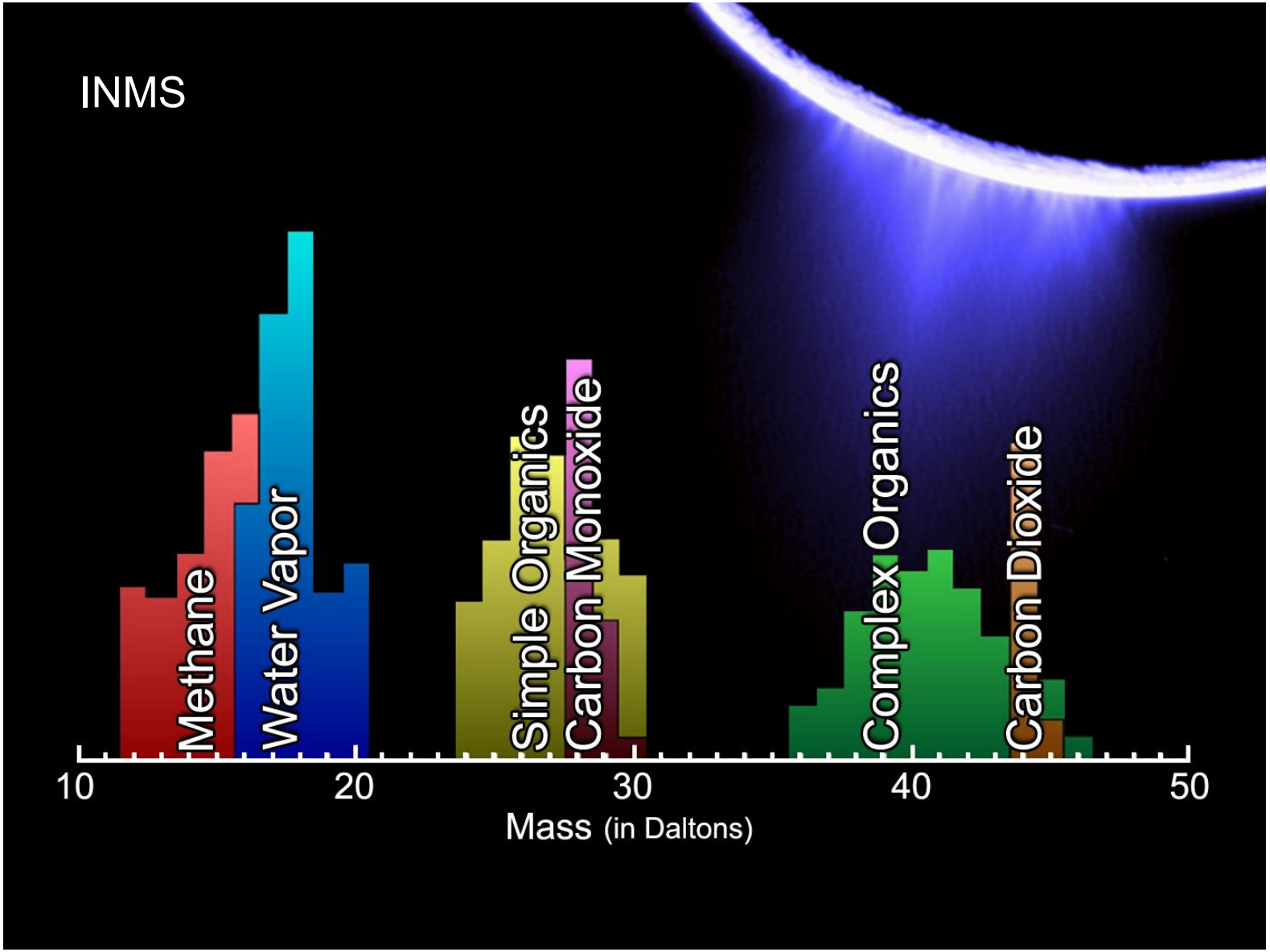
Cracks on surface

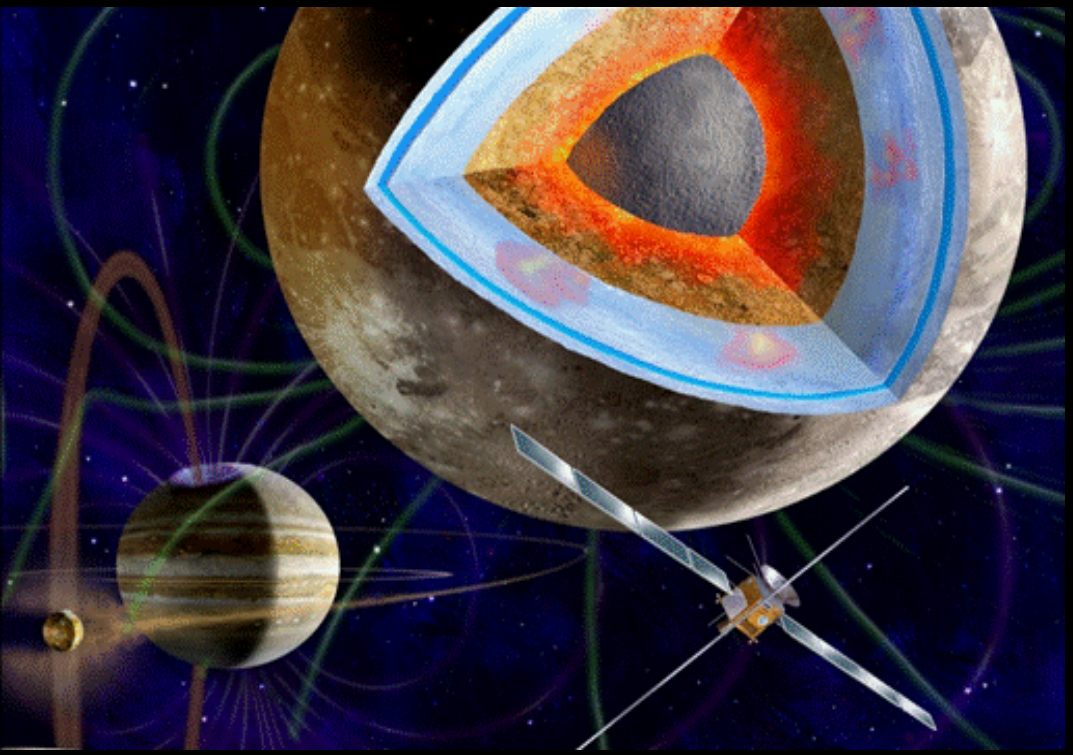

Hot Plasma Flow
Enceladus


Hot Plasma Flow
Neutral Cloud

- Fractures/ Tiger Stripes near south pole
- Warm Spot near south pole
- Internal heat leaking out?
- Warmest temperature over one of fractures
- ISS & CIRS data (Porco et al., Spencer et al, 2006)




INMS
Methane
Water Vapor
Simple Organics
Carbon Monoxide
Complex Organics
Carbon Dioxide
10
20
30
40
50
Mass (in Daltons)



JUICE Science Themes

- *Emergence of habitable worlds around gas giants*
- *Jupiter system as an archetype for gas giants*

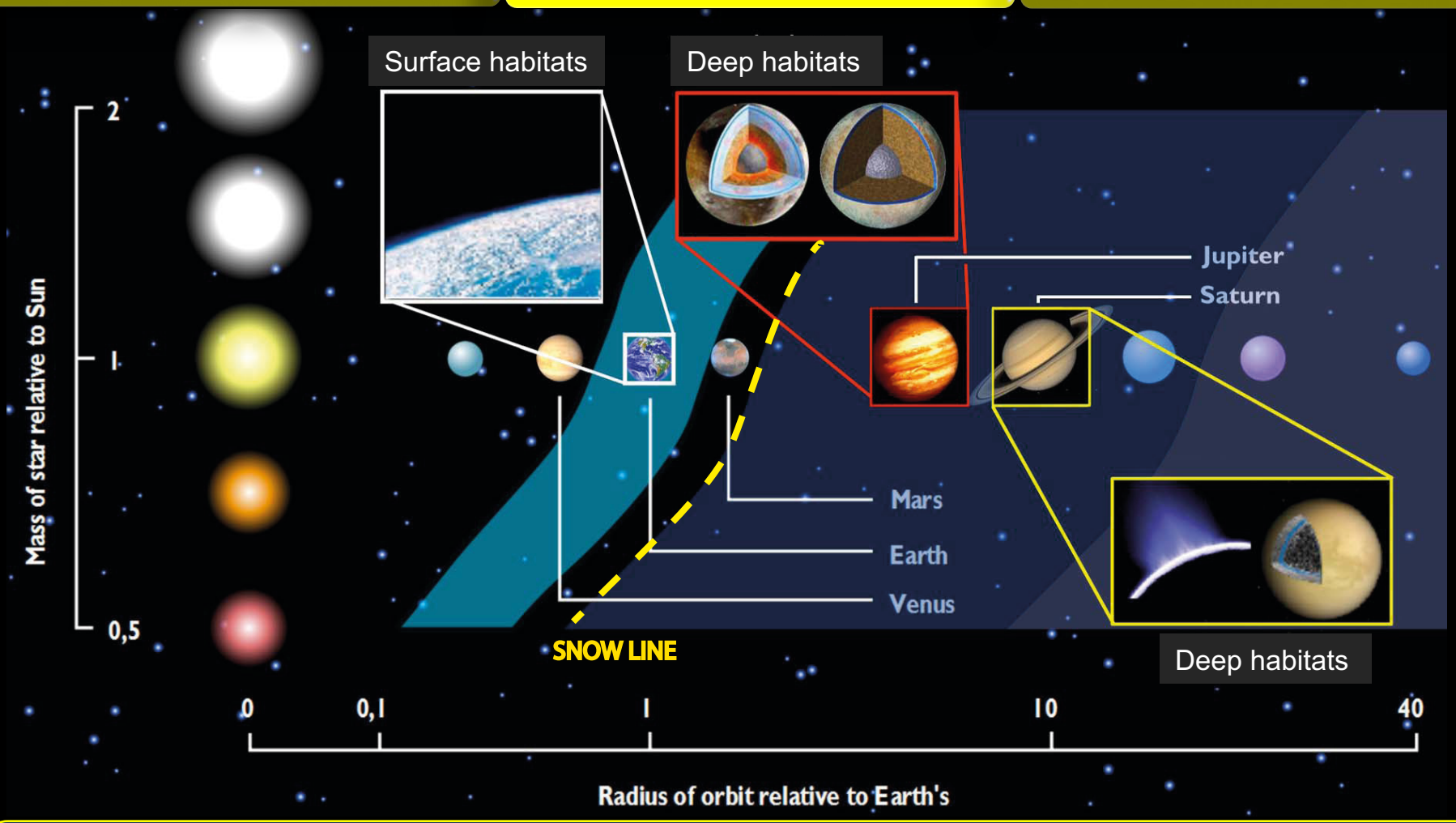
JUICE concept

- *European-led mission to the Jovian system*
- *Two Europa flybys and high-inclination phase at Jupiter*
- *10 Callisto flybys, orbits Ganymede*
- *First orbiter of an icy moon*

From the Jupiter system to extrasolar planetary systems

JUICE

Waterworlds and giant planets | Habitable worlds | Astrophysics Connection



Cosmic Vision: The quest for evidence of life in the Solar System must begin with an understanding of what makes a planet habitable

Ganymede and Europa are the archetypes of two classes of habitable worlds

Building an instrument in lockdown

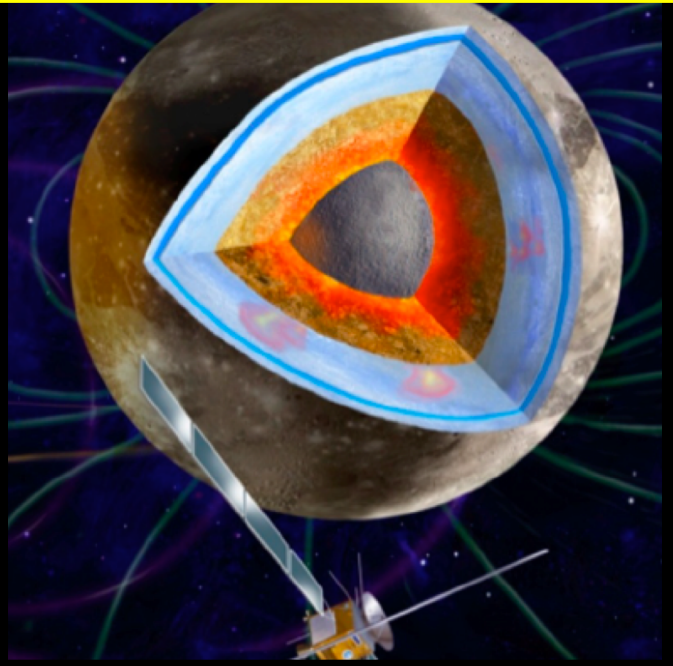
Exploration of the habitable zone at Jupiter by JUICE

Three large icy moons to explore

Ganymede

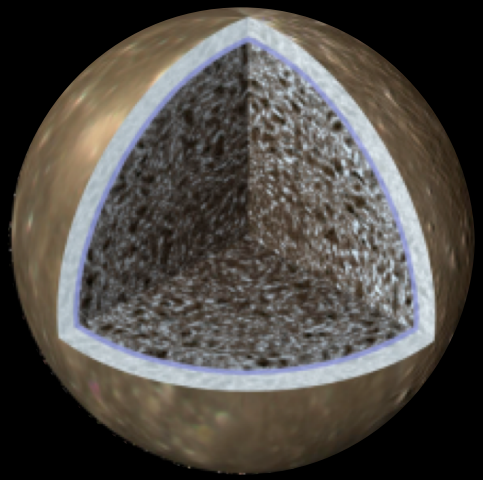
- Largest satellite in the solar system
- A deep ocean
- Internal dynamo and an induced magnetic field – unique
- Richest crater morphologies

- Archetype of waterworlds
- Best example of liquid environment trapped between icy layers



Callisto

- Best place to study the impactor history
- Differentiation – still an enigma
- Only known example of non active but ocean-bearing world
- The witness of early ages



Europa

- A deep ocean
- An active world?

- Best example of liquid environment in contact with silicates