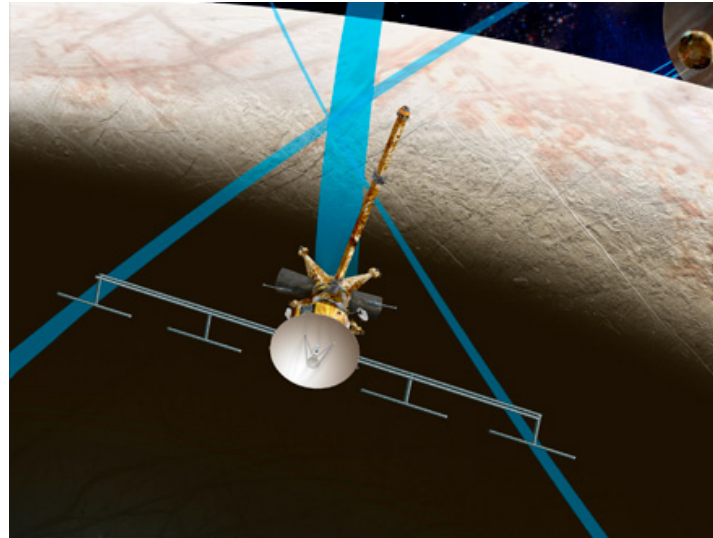
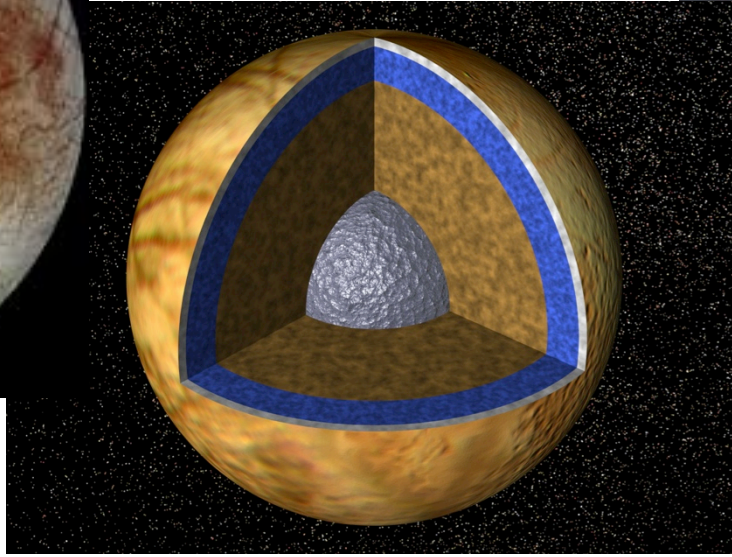
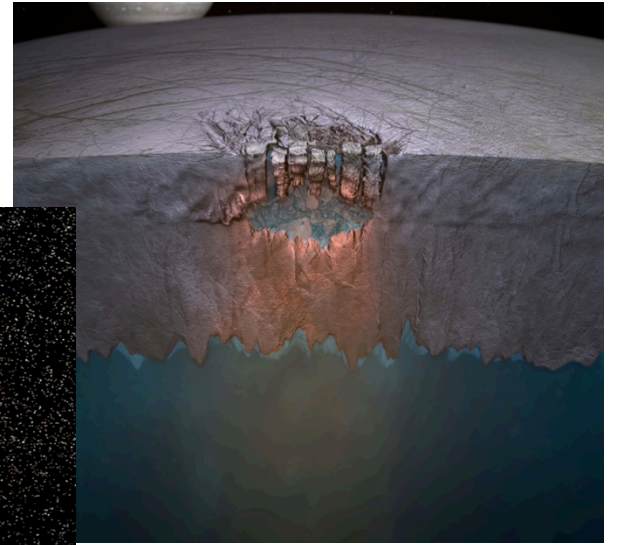
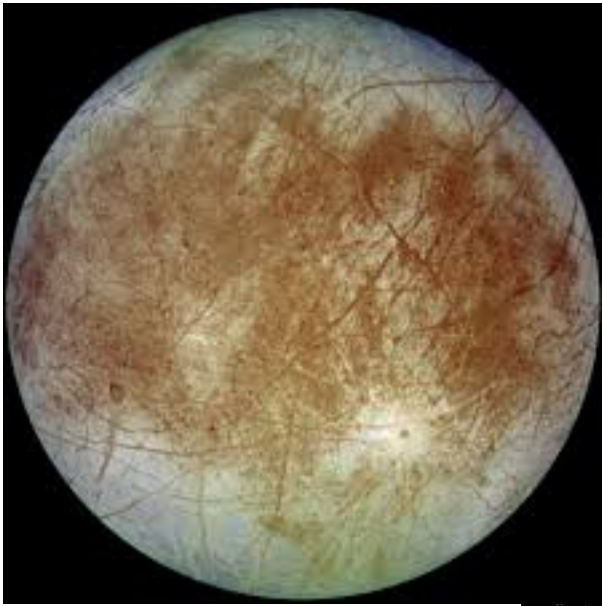


# Europa Science in the Next Decade (s)

OPAG Committee

B. Schmidt



# 1. How does Europa's Ice Shell Work?

- Europa's surface is young and probably active, what is going on?
  - Processes forming ridges
    - Cycloids
    - Double Ridges
    - Ridge Complexes
  - Processes forming bands
    - Extensional
    - Destruction?
  - Formation of Chaos
    - Thin? Thick?
    - Endogenic or exogenic heat?

## 2) What is the interior structure of Europa?

- We know there is ice and water, and then silicate +/- iron core, what is going on?
  - Depth of the Ice
    - Implications for geology, habitability
  - Depth of ocean
    - Implications for heat flow, habitability
  - Deep interior
    - Iron core? Size? Composition?
    - Implications for heat budget, activity, habitability

### 3) What is the distribution of water within Europa?

- We know there is water in an ocean, but what is going on with water in the shell?
  - Depth of Ice & Ocean
    - Implications for heat budget
  - Fractures, Dikes, Sills
  - Water pockets in the shell
    - Water moving around?
    - How much?
    - Distributed or localized sources?
  - Plumes
    - How, where, and why?

# 4) What is Europa's surface, ocean, and interior composition?

- There is dark and light material, exogenic and endogenic, but how is it formed and what's going on with the ocean and interior composition?
  - Distribution of endogenic and exogenic material
    - Nature of this contribution and implications for habitability
  - Ocean composition
    - History of formation, support for biology?
  - Interior composition
    - Same material as terrestrial planets?
    - Role in habitability

# 5) Is Europa habitable today? Was it ever? Has life arisen on Europa?

- Ice, Ocean, in contact with silicates, but is it active? Is there really potential for life?
  - Does Europa possess the necessary ingredients for life?
    - Nature of this contribution and implications for habitability
  - Did it ever?
    - History of formation, support for biology?
  - Has life ever arisen on Europa?
    - Same origins as terrestrial planets? Hugely important question!!
    - History of habitability and the entire system