



Credits to Amol !

Thank you all

**for your participation and
contributions to this workshop !**

...for preparing great pedagogical talks

... for making the extra effort
to understand each other's jargon

... for being there on zoom be it
breakfast, lunch, dinner or even night time

**We hope this is only the start of
an exciting adventure !**

(reminder: we are looking for enthusiastic volunteers
to organize this meeting next year 😊)

→ let's go forward with the white paper idea!

Sources of neutrinos

- Geoneutrinos
- Astrophysical neutrinos (supernovae)
- Atmospheric neutrinos
- [neutrino beam]

Detection techniques

- Liquid scintillators
- Liquid Argon
- Water Cherenkov: Mton, Gton
- Magnetized calorimeters
- Next(-to-next) Generation ?



**Earth for Neutrinos,
Neutrinos for Earth**

Neutrino Methodologies

- Radioactive decays (U/Th/K)
- Absorption tomography
- Oscillation tomography

Geophysical observables:

- Radiogenic heat
- density: 1D profile, position of the CMB (and ICB?), large-scale inhomogeneities
- electron density: profile, inhomogeneities
- ...

NEUTRINO COMMUNITY

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Geosciences
« sources » &
methodologies

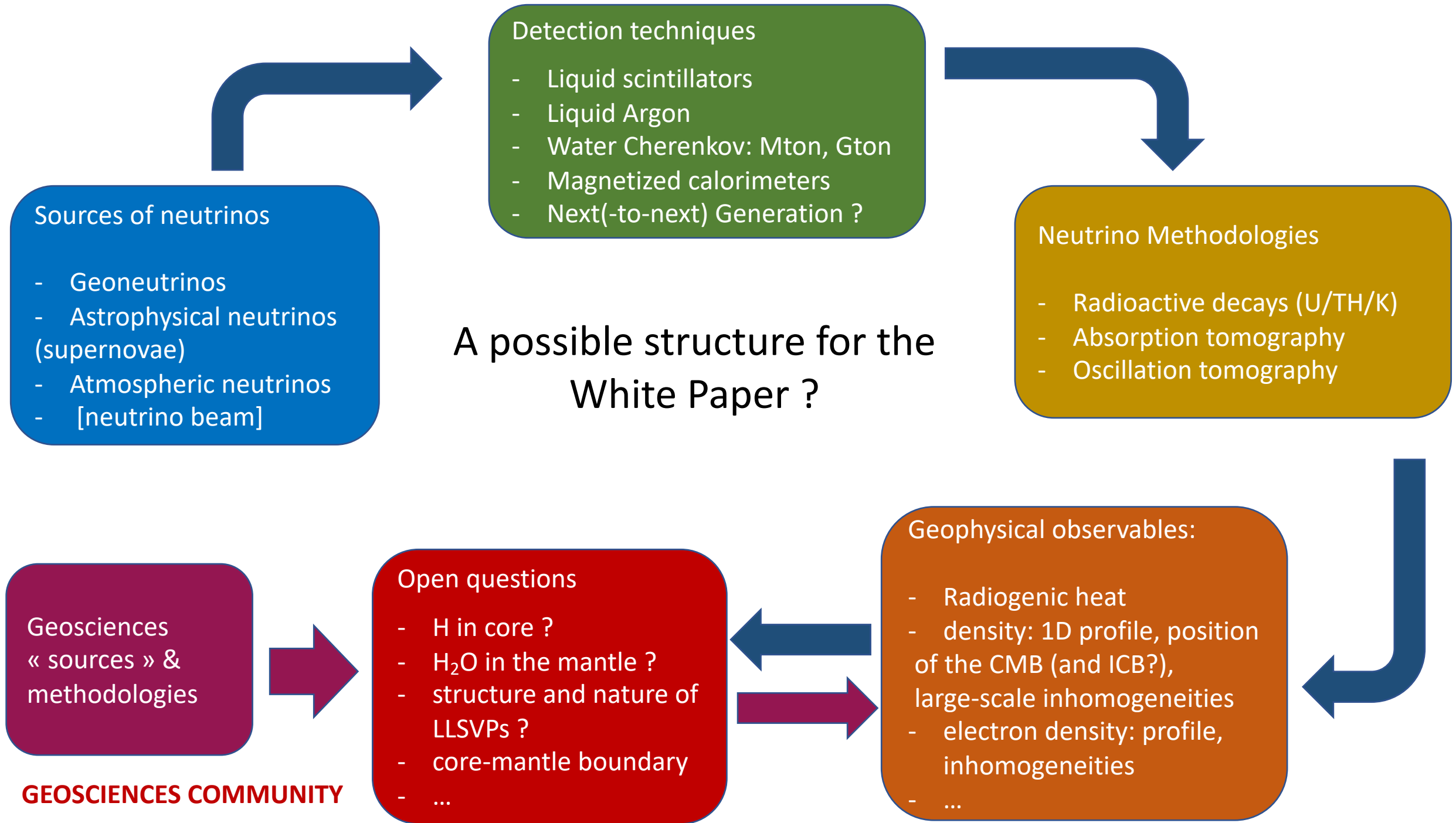
GEOSCIENCES COMMUNITY

Open questions

- H in core ?
- H₂O in the mantle ?
- structure and nature of LLSVPs ?
- core-mantle boundary
- ...

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A possible structure for the White Paper ?

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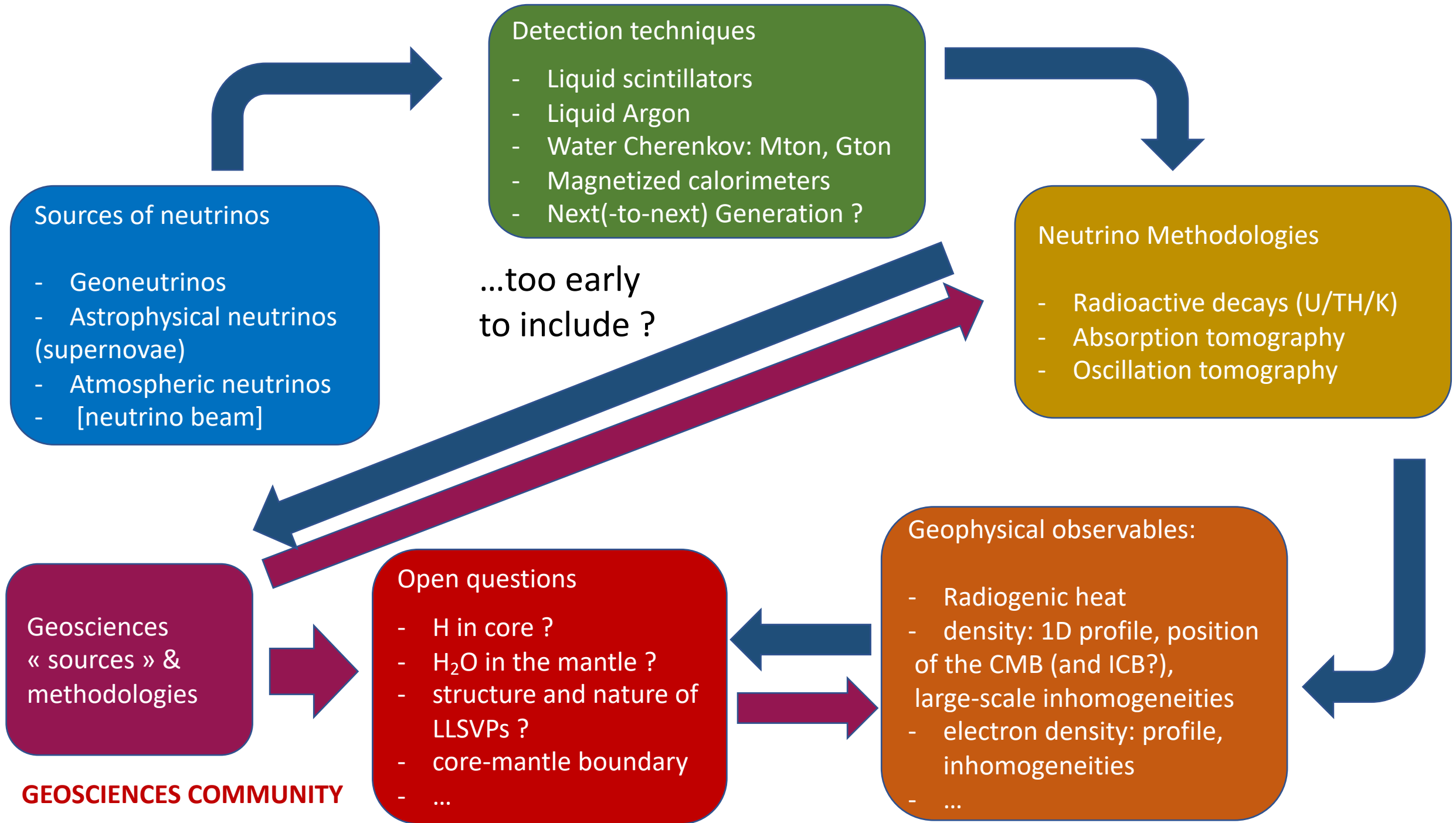
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Geosciences « sources » & methodologies

GEOSCIENCES COMMUNITY



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...too early to include ?

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Geosciences « sources » & methodologies

GEOSCIENCES COMMUNITY

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Sources of neutrinos

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- Description of the sources
- main uncertainties (as systematics for our measurements)
- their projected evolution

Detection techniques

- Liquid scintillators
- Liquid Argon
- Water Cherenkov: Mton, Gton
- Magnetized calorimeters
- Next(-to-next) Generation ?

- Description of main detection techniques
- Performances of families of detectors:
 - energy reconstruction
 - angular accuracy (zenith & azimuth)
 - flavour identification
 - charge identification ($\nu / \bar{\nu}$)
- Most critical parameters for geoscience-related measurements
- Expected improvements in the next(-to-next) generations

Use generic tools based on response functions ?

(see e.g. EarthProbe framework)

How much detail about specific experiments ?

❖ OBD as first detector optimized for neutrino geoscience !

- Description of the methods
- Statistical approaches

Neutrino Methodologies

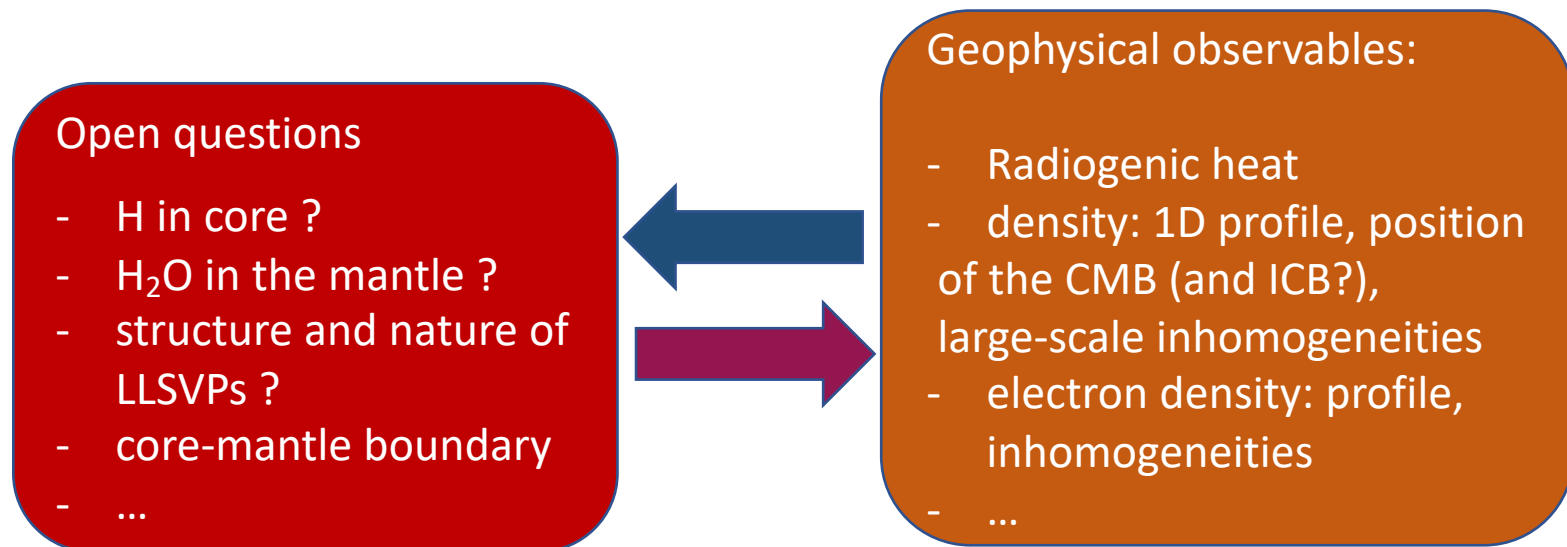
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**Include detailed description of
computational recipes ?**

How to combine data from different detectors ?

- State of the art of neutrino geoscience measurements: Geoneutrinos, absorption tomography with IceCube
- Sensitivity studies for current-generation detectors
- Projections for next(-t-next) generation
- - Detector requirements to optimize the science reach

Advocate for electron density as a new geophysical observable ?



General challenges:

- Which audience are we writing for ?
- What strong case(s) do we want to make ?
- Which science case for which timescale ?
Do we want to project the field into the next 10 -20 -50 -100 years ?
- Which balance between geoneutrinos and neutrino tomography ?
- How long (or short) should the paper be ?
- How do we organize the writing ? Timescale, writing teams...
(already several expressions of interest:
Arwen Deuss, John Hernlund, Tommy Ohlsson, Doyeon Kim, Livia Ludhova,...)