Welcome in Paris !

Welcome to the

2d workshop on Multi-messenger Tomography of the Earth!

Jointly organized by

Laboratoire AstroParticule Et Cosmologie

Institut de Physique Globe de Paris

Also with the support of

Labex UnivEarthS

Sciences Université Paris Cité

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Organizing Committee

- **Veronique Van Elewyck (AstroParticule et Cosmologie – Université Paris Cité & Institut Universitaire de France) -- chair**
- Sanjib Kumar Agarwalla (Institute of Physics, Bhubaneswar and UW-Madison)
- Joao Coelho (AstroParticule et Cosmologie - CNRS/IN2P3)
- Stephanie Durand (Laboratoire de Géologie de Lyon)
- Nobuaki Fuji (Institut de Physique du Globe & Institut Universitaire de France)
- Edouard Kaminski (Institut de Physique du Globe de Paris)
- Rebekah Pestes (Université Paris Cité & Institut de Physique du Globe de Paris)
- Carsten Rott (University of Utah & Sungkyunkwan University)
- Sarodia Vydelingum (AstroParticule et Cosmologie - CNRS/IN2P3)

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Scientific Program Committee

- Sanjib Kumar Agarwalla (Institute of Physics, Bhubaneswar & UW-Madison)
- Amol Dighe (Tata institute of Fundamental Research)
- Francis Halzen (UW-Madison)
- Patrick Huber (Virginia Tech)
- Vedran Lekic (Department of Geology, University of Maryland)
- Bill McDonough (University of Maryland & Tohoku University)
- Carsten Rott (University of Utah & Sungkyunkwan University)
- Hiroko Watanabe (Tohoku University)
- Véronique Van Elewyck (AstroParticule et Cosmologie – Université Paris Cité & Institut Universitaire de France)

Practicalities

- All sessions will take place in **amphitheatre Pierre-Gilles de Gennes**, except (maybe) for White Paper session on Friday afternoon: **room 483A (4th floor, same building)**

- Coffee breaks will be served in the **gathering space on floor -1**

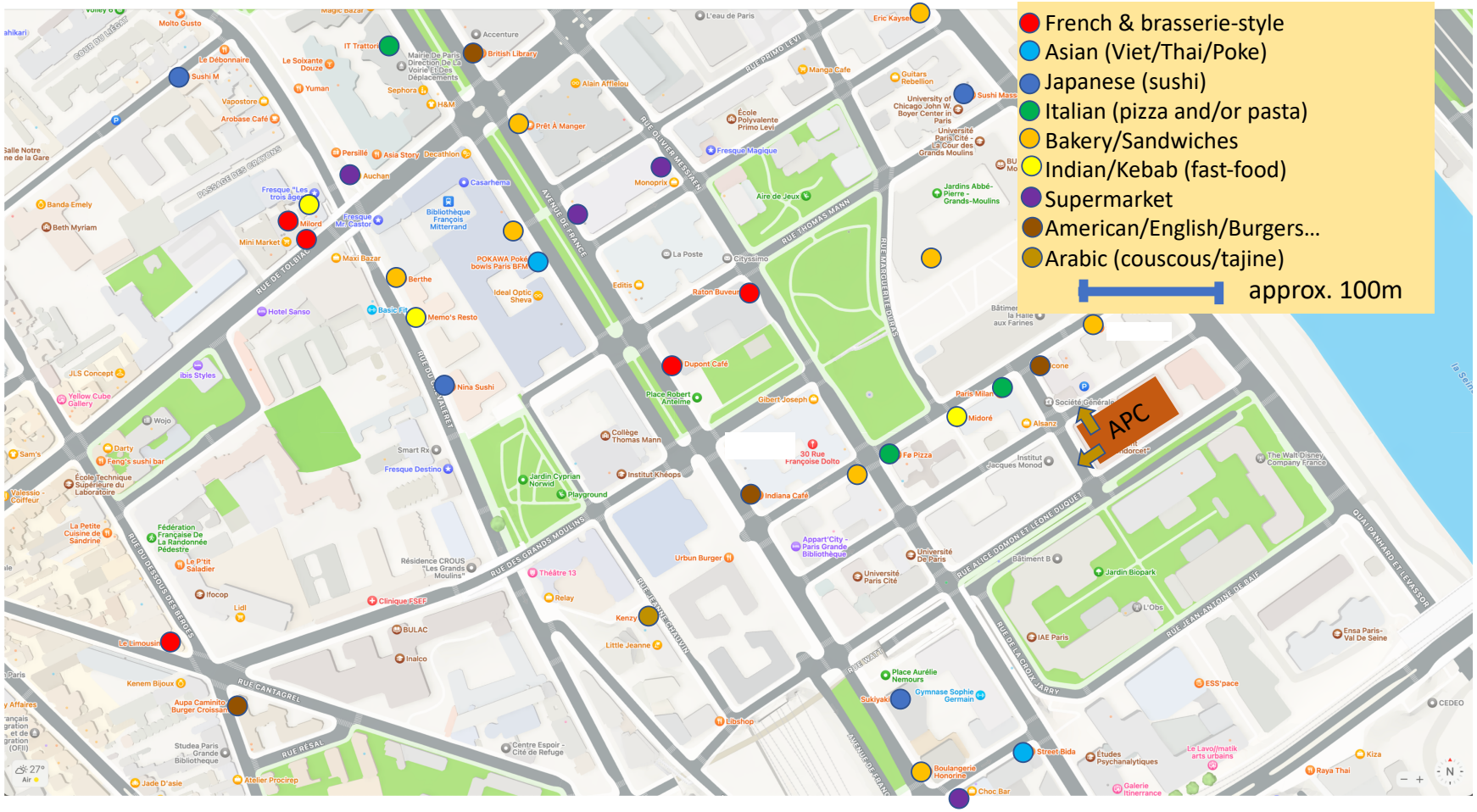
- Wifi access**: login/pwd is provided at the back of our name tag**

- **Thursday 6 pm: Wine and Cheese tasting** in the gathering space in front of **room 454A (4th floor, same building)**

- Sarodia has **maps of Paris**
  booklets of abstracts

Practicalities

- Lunch time slot: **Wednesday 12:30 – 14:00**
  Thursday 12:15 – 13:30
- Plenty of options in the neighborhood, **see map**



Practicalities

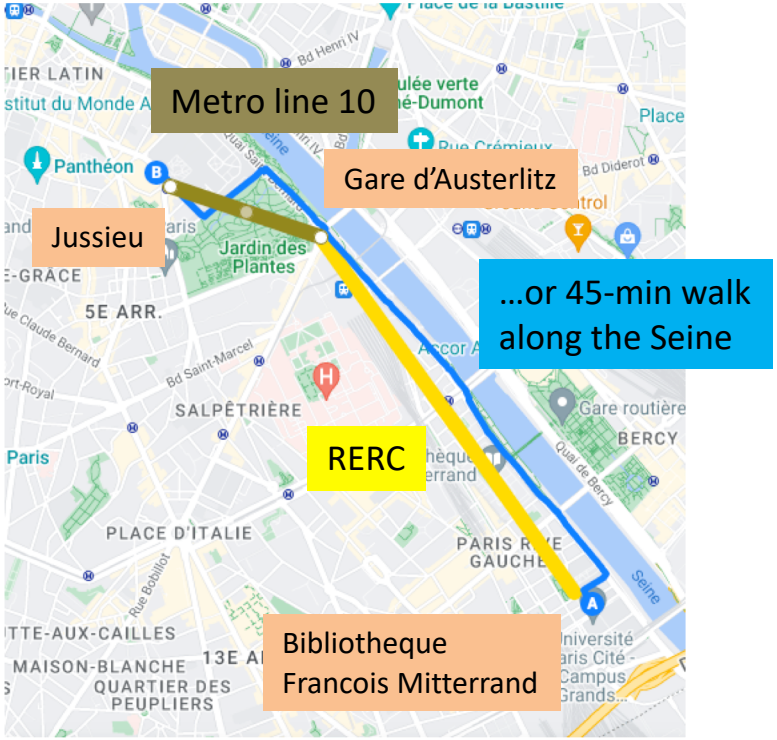
- Social dinner on Wednesday, 19:30 pm

Restaurant « Le Buisson Ardent »

25 rue Jussieu - 75005 Paris - Tel: 01 43 54 93 02

Dinner « à la carte »

Public transportation options:
RERC till Gare d'Austerlitz (1 stop), then metro line 10 till Jussieu
Bus 89 till Jussieu



Practicalities

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Restaurant « Le Buisson Ardent »

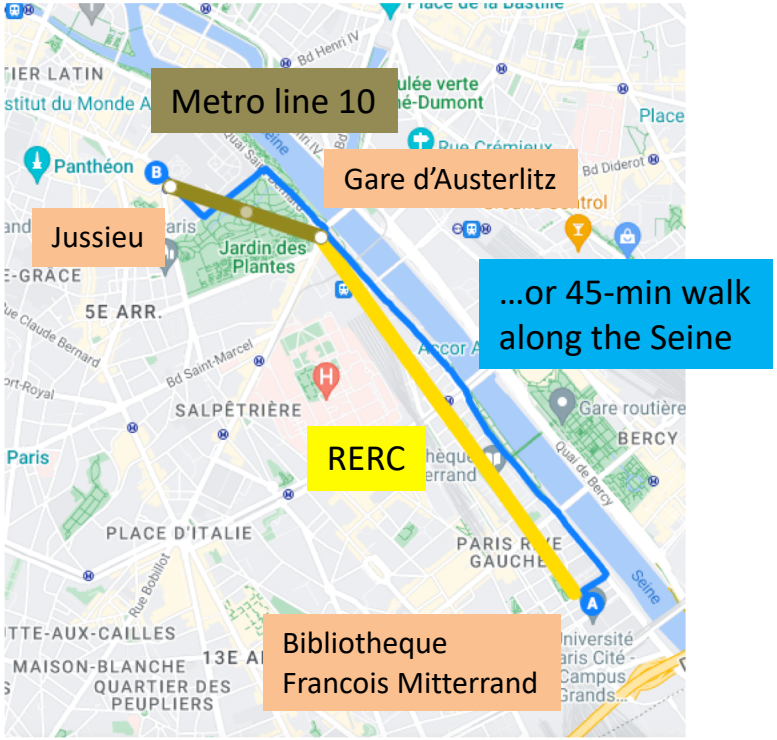
25 rue Jussieu - 75005 Paris - Tel: 01 43 54 93 02

Dinner « à la carte »

Public transportation options:

RERC till Gare d'Austerlitz (1 stop), then metro line 10 till Jussieu (1 stop) – about 25 minutes

Bus 89 till Jussieu - about 30 minutes



Workshop organization

	Tuesday	Wednesday	Thursday	Friday
AM		Methodologies and numerical approaches to inversion problems	Mantle-crust connection and Earth's heat budget	Conclusions and perspectives discussion onToC of white paper
PM	Introduction to neutrino & geoscience	Open questions in the study of Earth's core and mantle - I	Open questions in the study of Earth's core and mantle – II	Redaction of white paper
		SOCIAL DINNER	Wine & Cheese	

Workshop organization

	Tuesday	Wednesday	Thursday	Friday
AM		Methodologies and numerical approaches to	Mantle-crust connection and Earth's heat	Conclusions and perspectives
PM		mantle - I	mantle – II	
		SOCIAL DINNER	Wine & Cheese	

Mix of in-person and remote talks

To ALL speakers: please upload your slides on the workshop webpage well in advance ! (…or ask the organizers to do it)

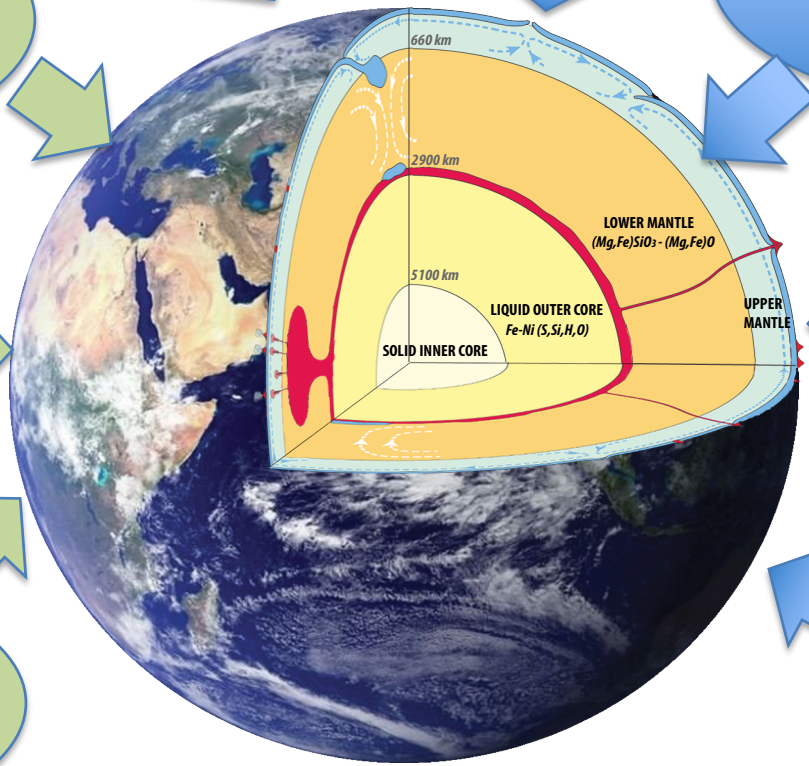
Purpose of the Workshop: multi-messenger investigation of the structure and content of the Earth

Geo neutrinos

Normal modes

Atmospheric neutrinos (absorption)

S- and P-waves, surface waves



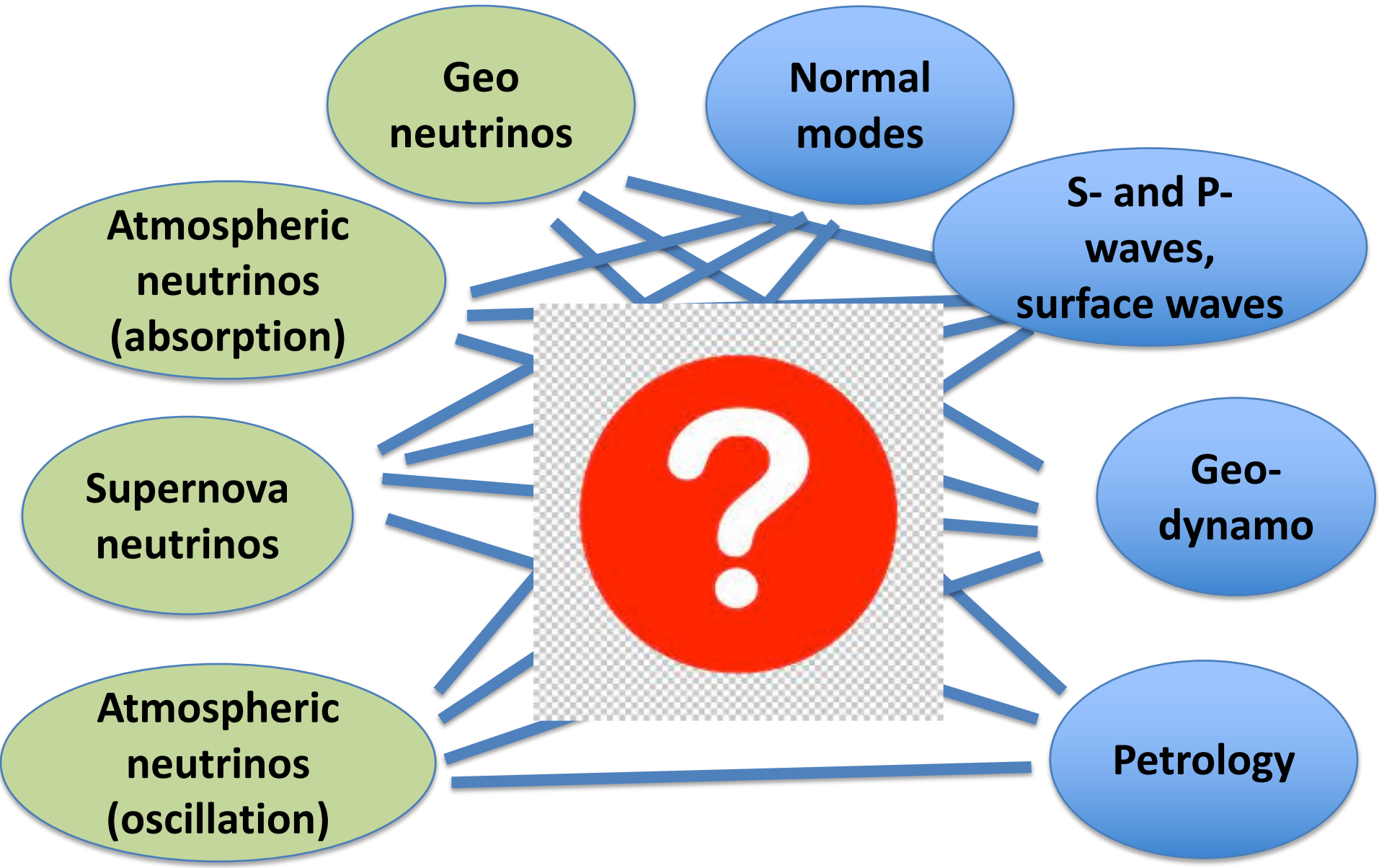
Supernova neutrinos

Geo-dynamo

Atmospheric neutrinos (oscillation)

Petrology

Purpose of the Workshop: multi-messenger investigation of the structure and content of the Earth



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PM	Introduction to neutrino & geoscience	Open questions in the study of Earth's core and mantle - I DISCUSSION SOCIAL DINNER	Open questions in the study of Earth's core and mantle – II DISCUSSION Wine & Cheese	Redaction of white paper

Suggested topics of discussion

- Methodological challenges:
  how to combine neutrino with geoscience data ?
  → Wednesday morning session
  how to combine different neutrino data & observables ?
  (geoneutrinos/)
  → Thursday morning session

- New observables of interst for geosciences
  brought by neutrino physics ?
  … one example: electron density as main observable
  for oscillation tomography
  → Wednesday afternoon session

- Open questions in geosciences that neutrino may help address ?
  → Thursday afternoon session

Workshop organization

Friday session:
Kickstart the work on a white paper on

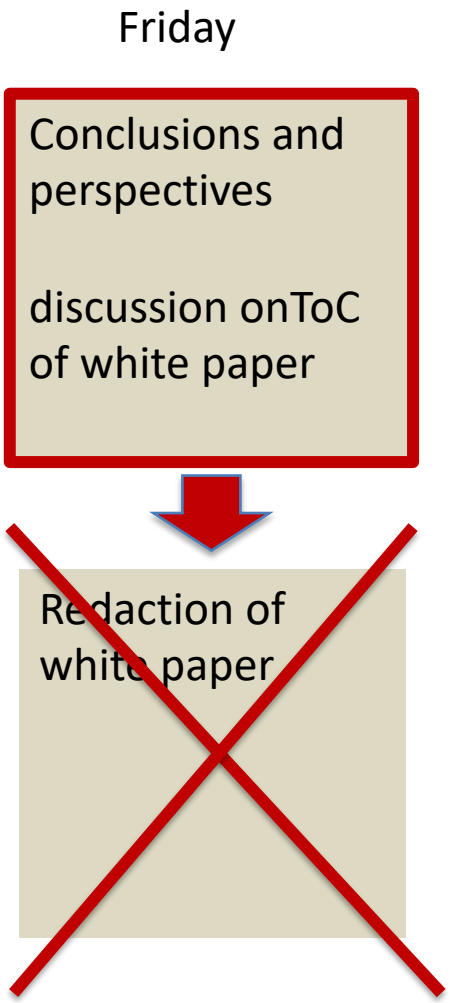
« Neutrino tomography of the Earth: science reach and methods »
(tentative title)

Proposal: move session to Friday early afternoon (13:30) to allow presence of key remote contributors

Please let us know about your interest to participate in this effort!

Following the Friday brainstorming, dedicated writing groups will be set up

Suggestions welcome !
(even if you can't attend Friday session)



Program of today

13:00

45 - Registration

Amphitheater Pierre-Gilles de Gennes, APC-Université Paris Cité 13:00 - 14:00

14:00

50 - Welcome address on behalf of LabEx Univ'EarthS *Nam Phan Van Song*

1 - Introduction to the workshop *Nobuaki Fuji et al.*

1 - Overview - neutrinos and geoscience *Véronique Van Elewyck*

15:00

1. Earth for neutrinos, neutrinos for Earth – prof. Amol Dighe (REMOTE)
2. Geosciences for neutrino physicists: a primer-- prof. Lauren Waszek

Amphitheater Pierre-Gilles de Gennes, APC-Université Paris Cité 14:30 - 15:50

Coffee break

16:00

Amphitheater Pierre-Gilles de Gennes, APC-Université Paris Cité 15:50 - 16:20

1 - Overview - neutrinos and geoscience *Véronique Va…yck*

3. Structure and composition of the Earth – prof. Bill McDonough
4. Current and future neutrino experiments with tomography potential
   -- prof. Carsten Rott (REMOTE)

17:00

Amphitheater Pierre-Gilles de Gennes, APC-Université Paris Cité 16:20 - 17:50