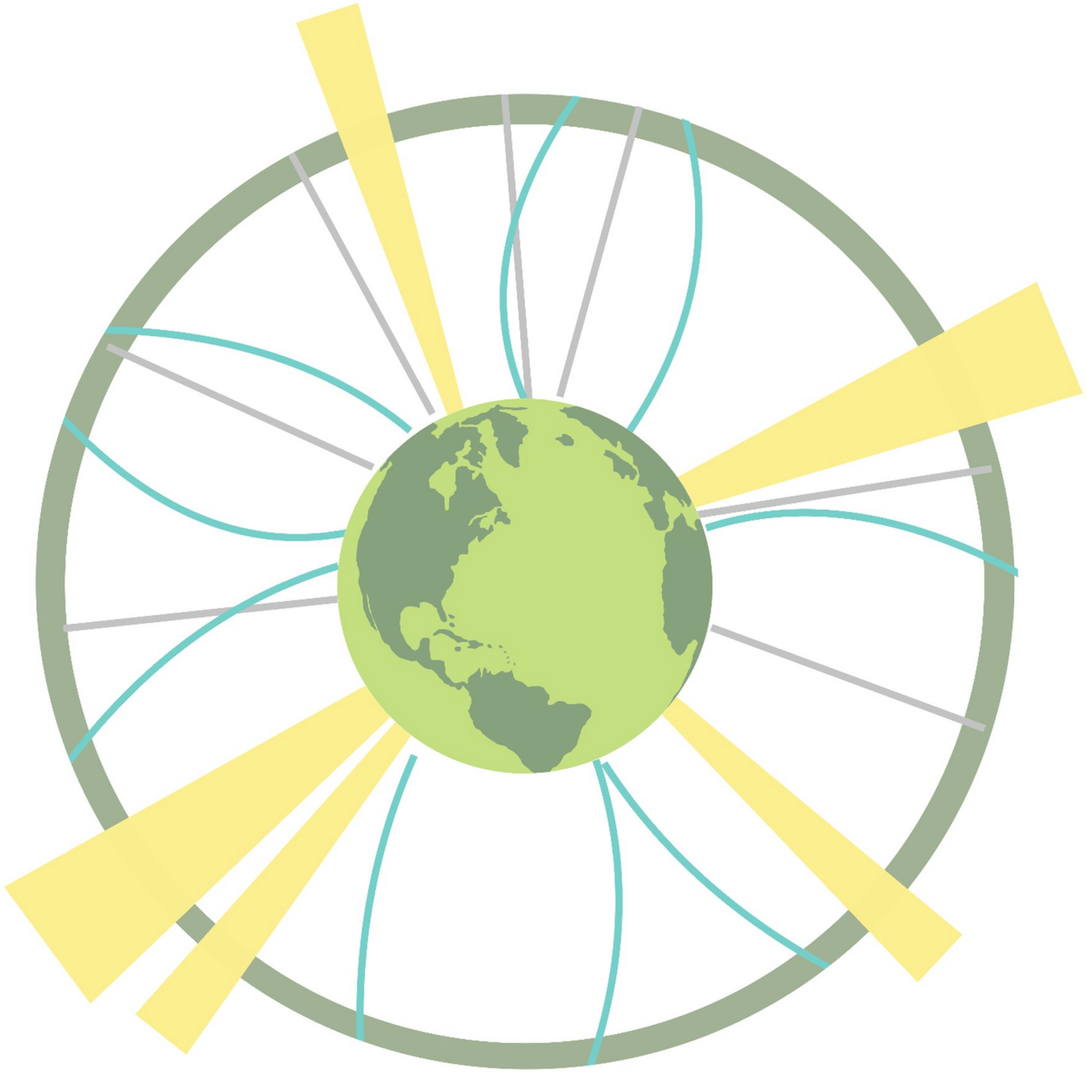
4th Edition of the

# Sustainable High Energy Physics Conference 2025

**12 - 15 May, 2025**



Contact: susthep25 “at” physics “dot” ox “dot” ac “dot” uk

John Adams Institute for Accelerator Science

ROYAL HOLLOWAY UNIVERSITY OF LONDON

UNIVERSITY OF OXFORD

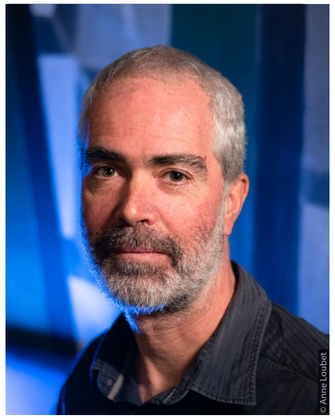
DEPARTMENT OF PHYSICS

CERN

# Organisers

Shreyasi Acharya

Chandramauli Agrawal




Yann Coadou

Stefania Juks

Vasiliki Mitsou

Sukanya Sinha

Hannah Wakeling

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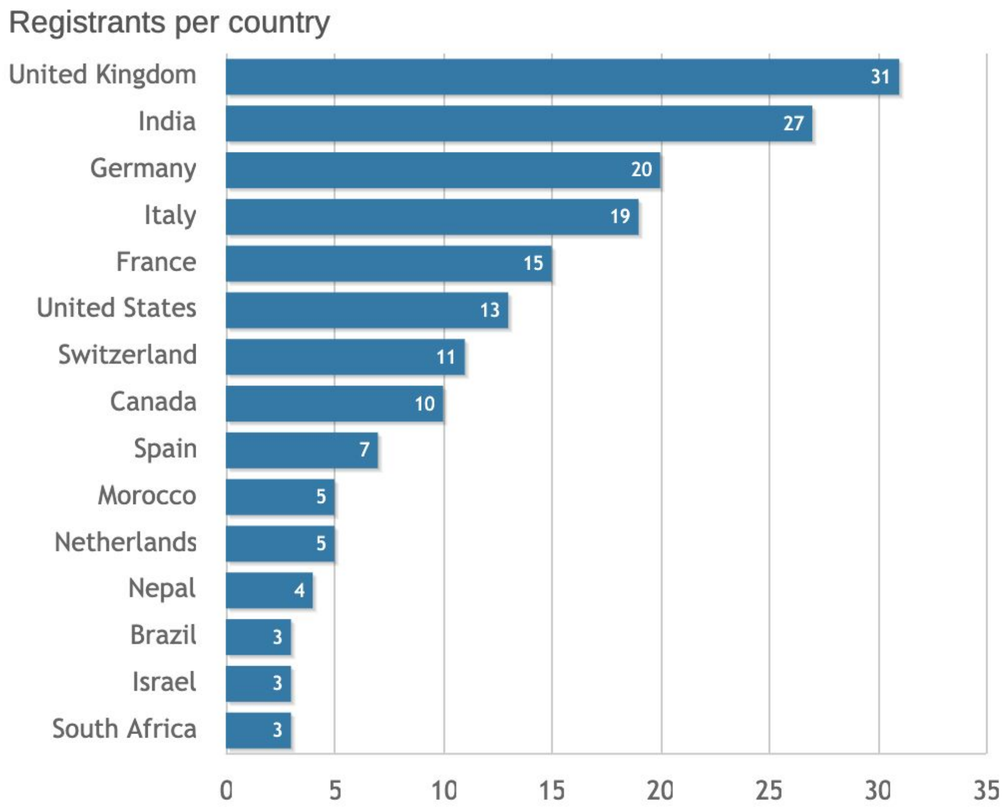
Thanks to additional organisational efforts from:
Bryce Cyr
Ellis Kay
Luca Quaglia

# Sustainable HEP

**204**
Registrations

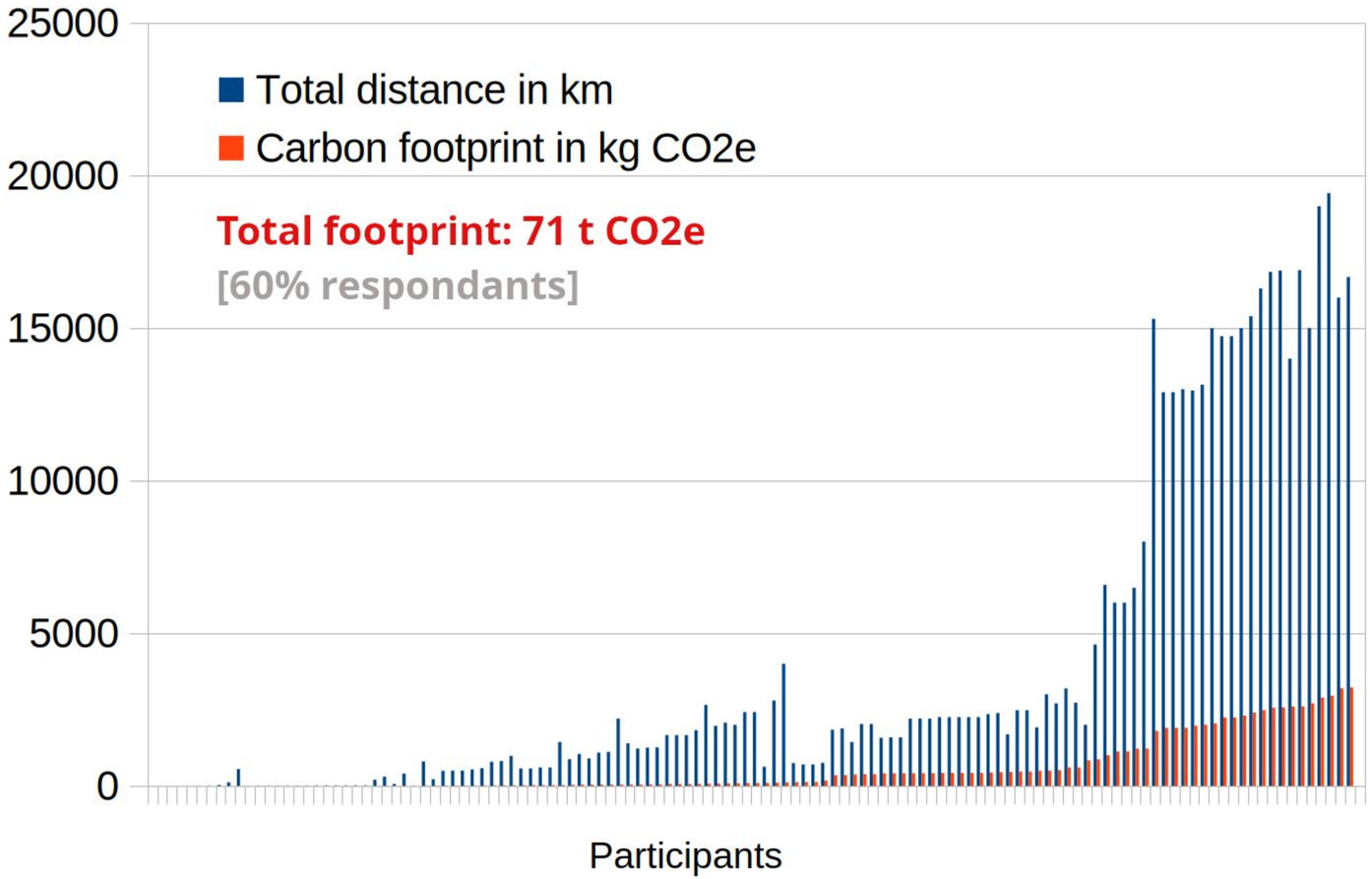
**3**
Days left to register

**37**
Countries

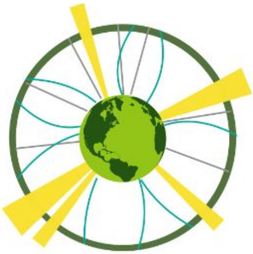


# Sustainable HEP

Avoided travel carbon footprint by running online-only meeting



# Goals of Sustainable HEP



- Increase awareness of the impact of High Energy Physics (HEP) on the environment.
- Discuss the intersection of HEP and climate crisis.
- Highlight the sustainability initiatives ongoing within and alongside the HEP community.
- Exhibit and deliver positive tangible steps forward.

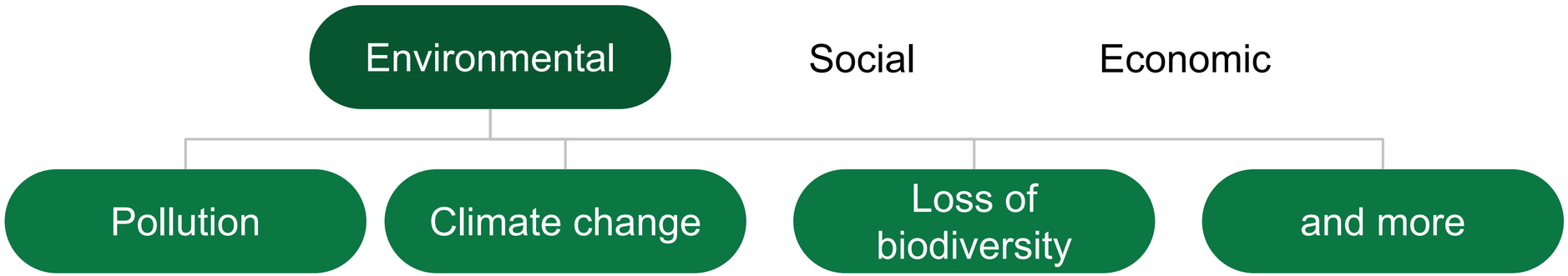
# Sustainability Context

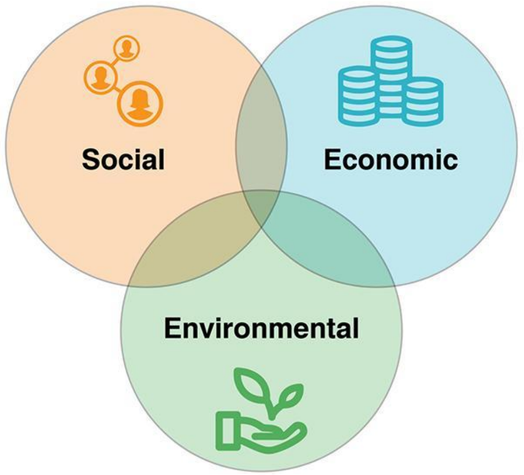
Sustainability/Sustainable development:

Ref: *Our Common Future (Brundtland Report), 1987; Section 3*

"To meet the needs of the present without compromising the ability of future generations to meet their own needs."

Sustainability has three pillars:

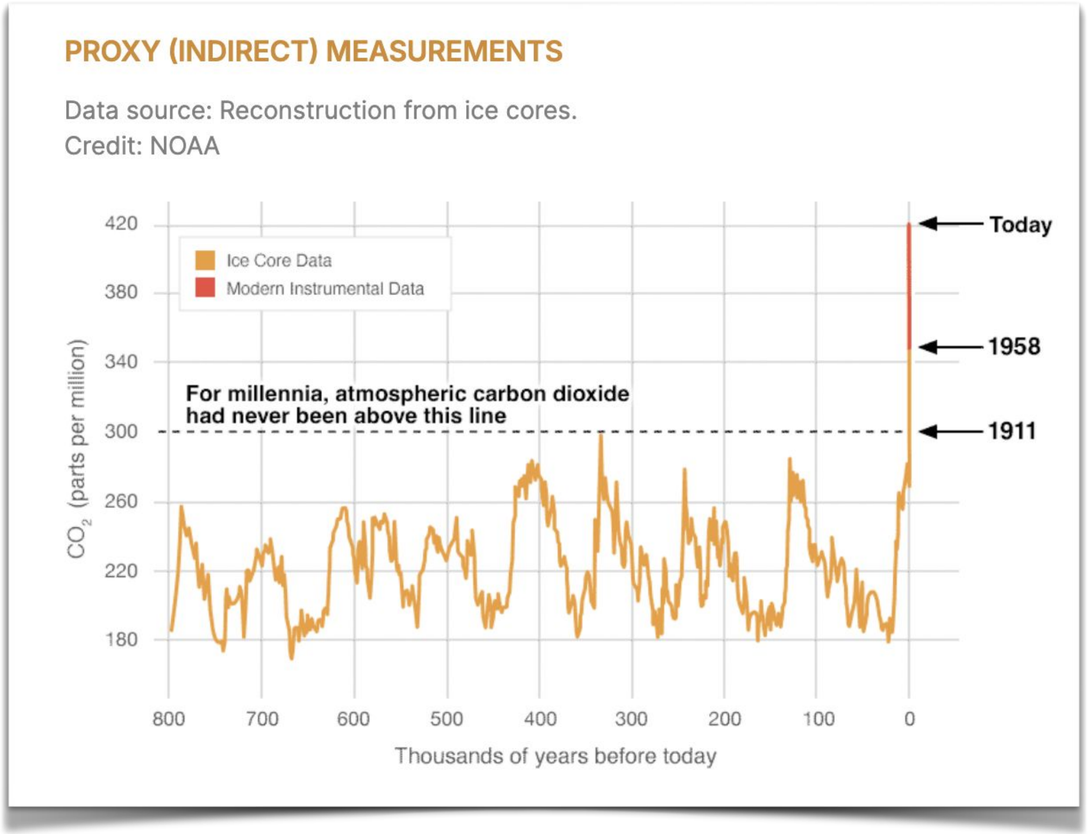



Sustainable HEP focuses on the intersection of HEP and environmental sustainability
(without forgetting the social and economic inequities of big science projects at the heart of HEP)

*For more information on all the aspects of sustainability, and incorporating them into daily actions, see the 17 Sustainable Development Goals (SDGs), adopted unanimously by all United Nations member states in 2015, at their website: https://sdgs.un.org/goals*

# Sustainability Context

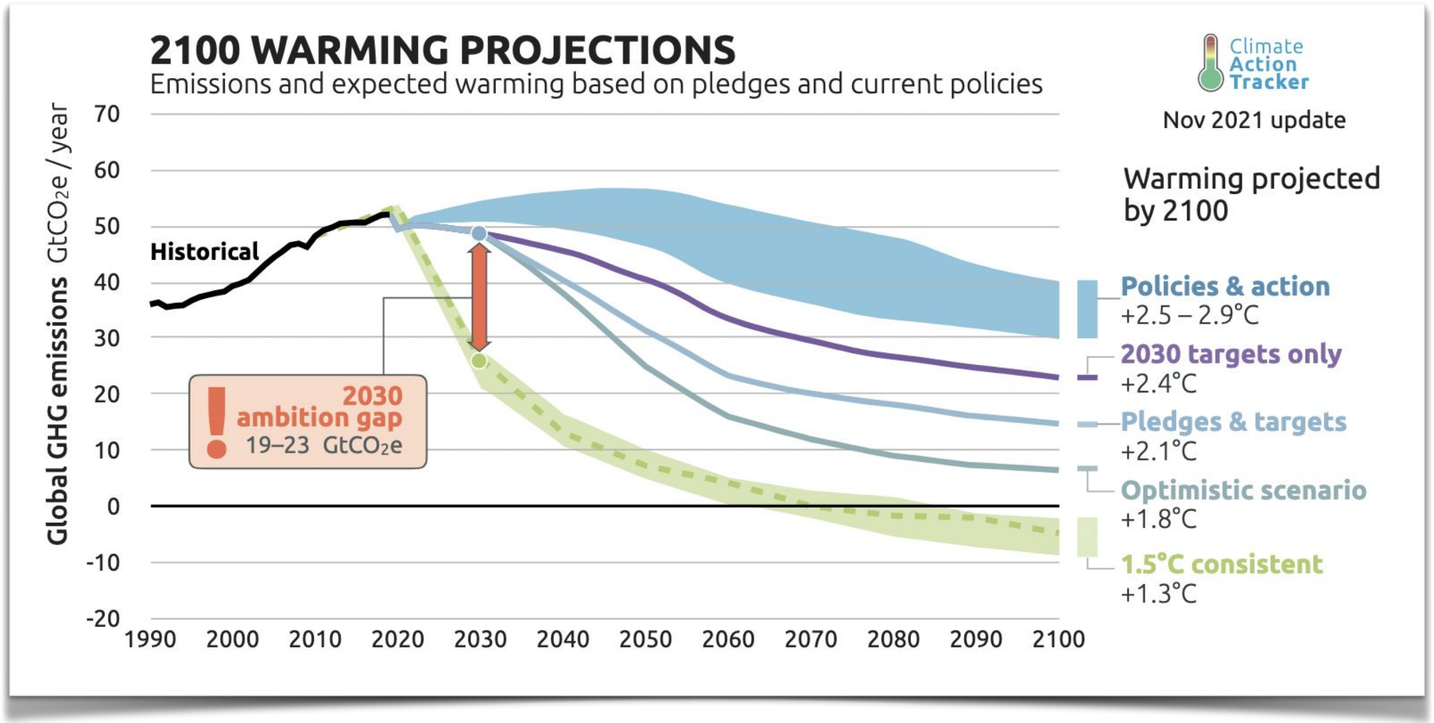



https://climate.nasa.gov/vital-signs/carbon-dioxide/?intent=121

[Ref: Philosophical Magazine and Journal of Science 41 (251) (1896) 237–276.]

- First study of heating of Earth's surface observed since pre-industrial era due to $CO_2$ in 1896.
- Greenhouse gases ($CO_2$, methane, etc) trap some of the heat that results when sunlight heats the Earth's surface.
- **Human activities (anthropogenic causes)**, such as burning of fossil fuels (coal, oil, gasoline, etc), deforestation, agriculture, transport, etc. are one of the direct contributors of GHGs.

# Sustainability Context




https://climateactiontracker.org/documents/1051/CAT_2022-06-03_Briefing_MidYearUpdate_DespiteGlasgowTargetUpdatesStalled.pdf

https://www.carbonbrief.org/explainer-how-the-rise-and-fall-of-co2-levels-influenced-the-ice-ages/?utm_source=chatgpt.com

**Extreme danger of exceeding 1.5°C warming (IPCC reports)**

Importance of “1.5°C”: Global average temperature during ice age, approximately **4°C cooler** than today!

**The world is heading to a warming of 2.4°C with 2030 targets** and even higher, 2.7°C, with current policies.

👉 *If a 4°C cooling created an Ice Age, can humanity handle a 2–3°C heating in the next 70 years?*

# HEP and Sustainability

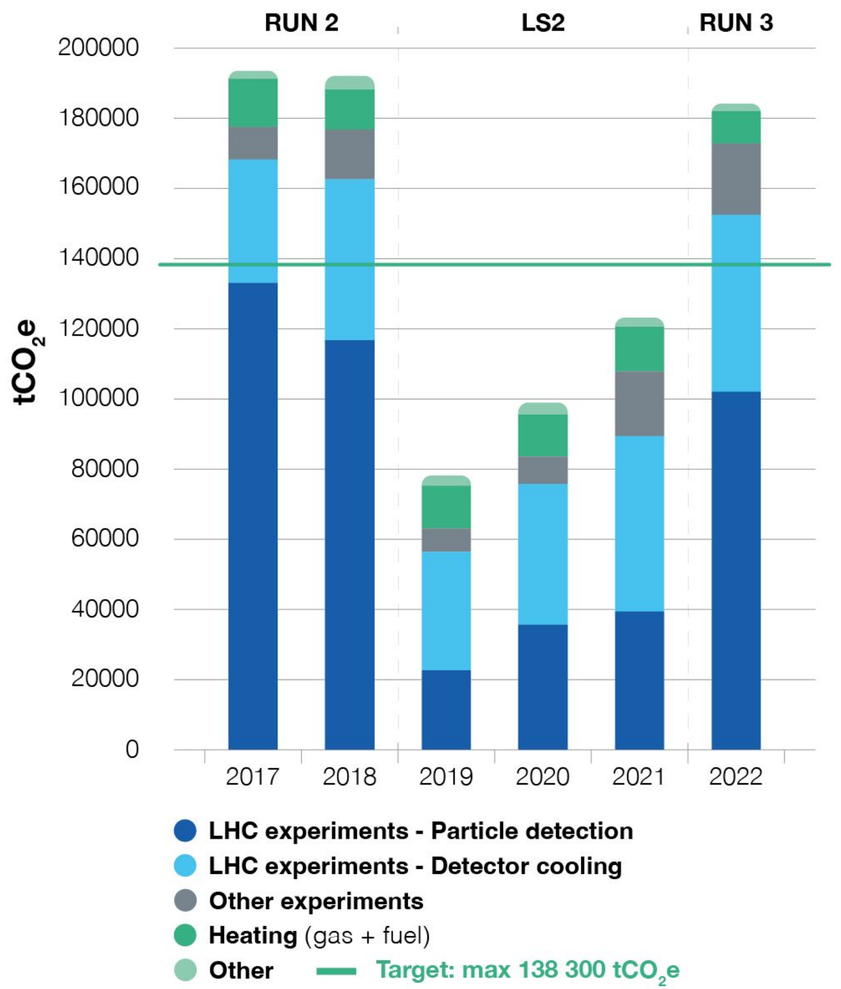
**Where does high energy physics intersect with emissions of Greenhouse Gases (GHGs)??**

Some examples are:

- Construction of facilities and components
- Consumption of resources
  - Energy
  - Gases
  - Water
- Computing
- Travel

**Aim:**

To sustainably and mindfully move forward in the future, facilitate the use of greener technologies and systems, and join the global effort of climate crisis mitigation and achieve positive outcomes.



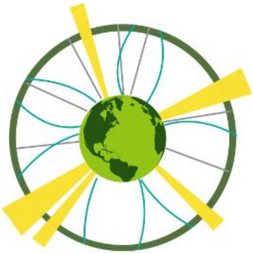

Ref: CERN HSE report

# Communication

- **We encourage you to turn your cameras on when speaking**
- **We will have to be strict with timing your talks**
  - We have a wonderfully packed schedule! So that we don't have to interrupt, please keep to time
- **Please upload your slides before your talk**
- **All sessions will be recorded** and uploaded to the Indico sessions as soon as possible
- **Sli.do** will be used for panel question submission (links to be published)
- **Mattermost channel** for further discussions (during and after the workshop) - https://mattermost.web.cern.ch/signup_user_complete/?id=idao6kzxsby1xrr8gkfti4q7wy&md=link&sbr=su
- **Linktr.ee** Sustainable HEP LinkedIn Group and social media: https://linktr.ee/susthep

These slides are available on the Indico schedule for the links!

# Code of Conduct



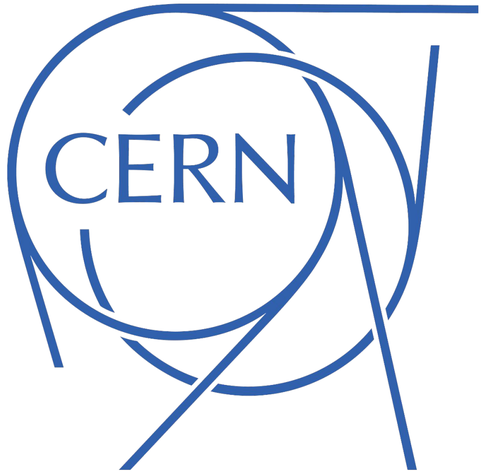
- **Participants are encouraged to include their full name and preferred pronouns in their Zoom display name.**

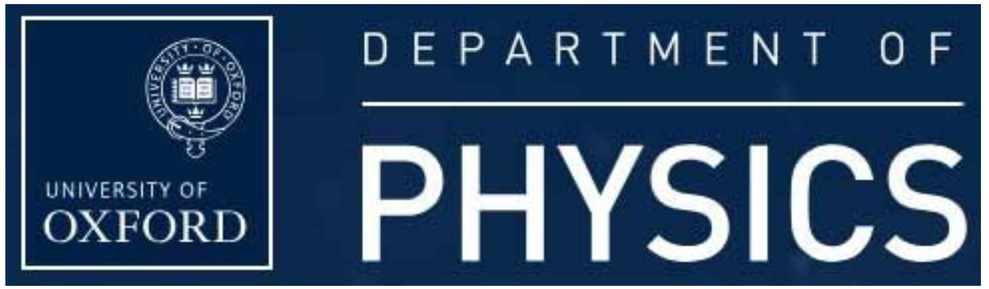
- **Participants should ensure that their microphones are muted when they are not speaking.**
  - Please use the raise-hand button ( ✋ ) or chat window (💬) to attract the attention of session convenors.

- **Participants are expected to treat one another with courtesy, respect, kindness and professionalism.**
  - Inappropriate language or behaviour, including bullying or harassment, will not be tolerated. This expectation applies across all of the programmed sessions, as well as any chat platforms or virtual environments associated with the conference.

- **All participants are expected to act with sensitivity toward the many distressing and ongoing troubles around the world.**

# Thank you to our in-kind sponsors!

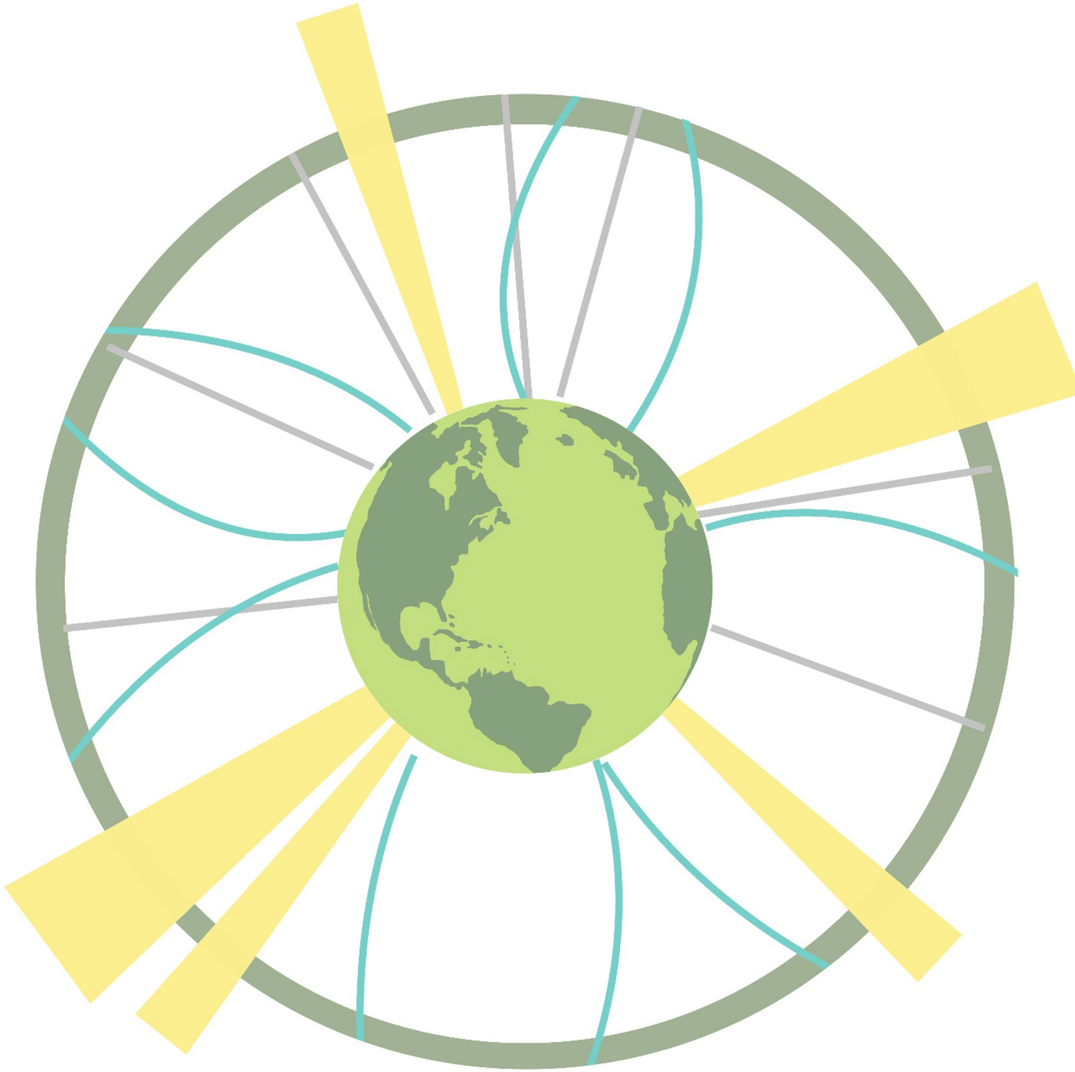


# Monday’s agenda

| | | |
|---|---|---|
| 11:00 (EDT) | **Welcome: Opening of Sustainable HEP 2025 (Americas time zone friendlier sessions)**<br>*Online* | *Dr Hannah Wakeling, Yann Coadou*<br>11:00 - 11:15 |
| | **Invited Talk: Prof. Ruth Wood**<br>*Online* | *Dr Hannah Wakeling, Yann Coadou*<br>11:15 - 12:15 |
| 12:00 | **Invited Talk: Dr. Caterina Vernieri**<br>*Online* | *Dr Hannah Wakeling, Yann Coadou*<br>12:15 - 12:45 |
| | **Invited Talk: Prof. Yamina Saheb**<br>*Online* | *Dr Hannah Wakeling, Yann Coadou*<br>12:45 - 13:15 |
| 13:00 | **Health Break**<br>*Online* | 13:15 - 13:30 |
| | **Flash Talks**<br>*Online* | *Dr Hannah Wakeling, Yann Coadou*<br>13:30 - 14:30 |
| 14:00 | | |

# Welcome!

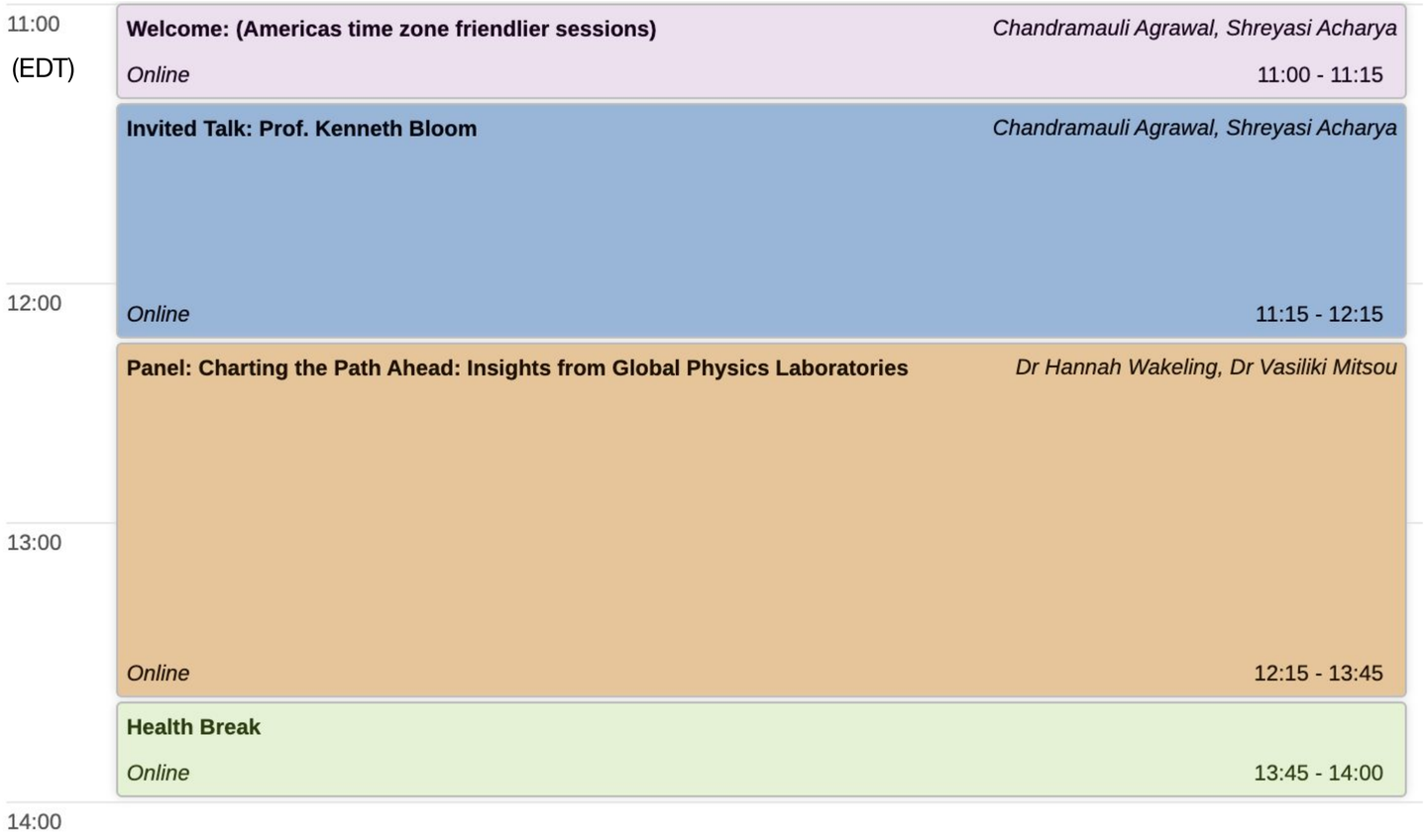


# Back-up slides

# Resources

- Mattermost channel for further discussions (during and after the workshop) - https://mattermost.web.cern.ch/sustainable-hep/channels/town-square
- Panels question submission via sli.do:
    - Tuesday: https://app.sli.do/event/kqbGVm2M7u2ffNspDFLMbN

# Tuesday’s agenda



# Wednesday’s agenda

| | | |
|---|---|---|
| 08:00 (CEST) | **Welcome: (Europe/Africa/Asia/Australia time zone friendlier sessions)**<br>*Online* | *Shreyasi Acharya, Stefania Juks*<br>08:00 - 08:15 |
| | **Invited Talk: Prof Julia Steinberger**<br>*Online* | *Shreyasi Acharya, Stefania Juks*<br>08:15 - 09:15 |
| 09:00 | **Submitted Talks**<br>*Online* | *Shreyasi Acharya, Stefania Juks*<br>09:15 - 09:45 |
| | **Health Break**<br>*Online* | 09:45 - 10:00 |
| 10:00 | **Submitted Talks**<br>*Online* | *Shreyasi Acharya, Stefania Juks*<br>10:00 - 11:15 |
| 11:00 | **Health Break**<br>*Online* | 11:15 - 11:30 |
| | **Flash Talks**<br>*Online* | *Shreyasi Acharya, Stefania Juks*<br>11:30 - 12:00 |
| 12:00 | **Submitted Talks**<br>*Online* | *Shreyasi Acharya, Stefania Juks*<br>12:00 - 13:30 |
| 13:00 | | |

# Thursday’s agenda