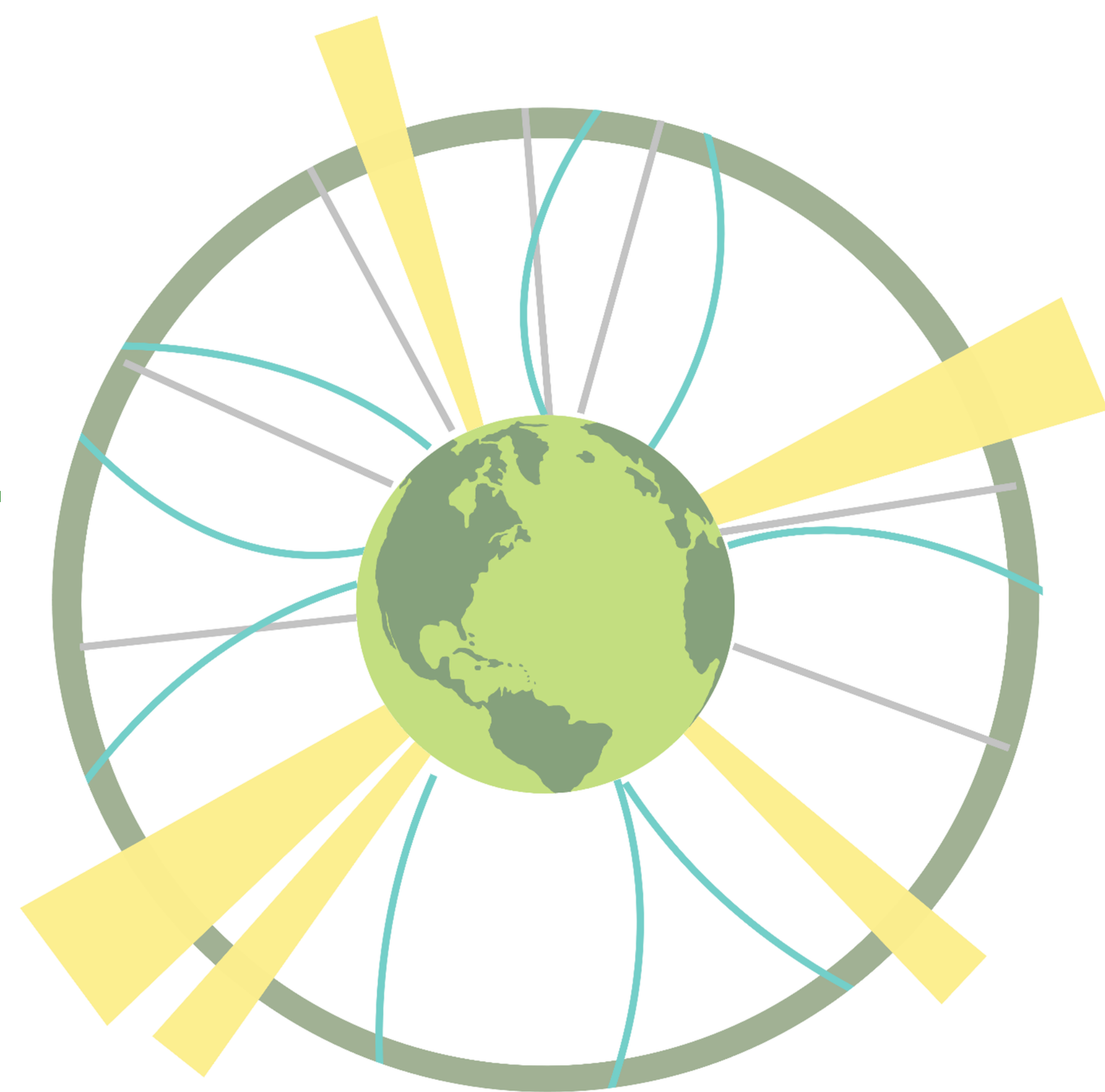


# Workshop Introduction

## Sustainable HEP 2024 - 3rd Edition

*10 - 12 June, 2024*



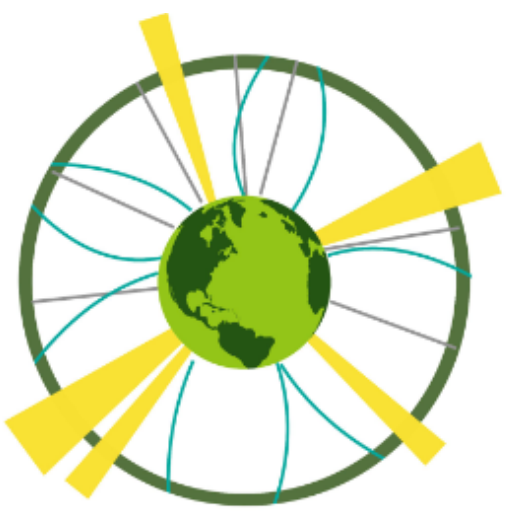
### Organizers :

Shreyasi Acharya (INFN Bari), Juliette Alimena (DESY), Daniel Britzger (MPP), Brendon Bullard (SLAC),  
Shreya Saha (Adelaide), Hannah Wakeling (Oxford)

Contact email: [susthep24@physics.ox.ac](mailto:susthep24@physics.ox.ac)

# Origins of the Sustainable-HEP Series

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## 1st Sustainable HEP workshop - **post-lockdown in 2021**

28th June - 1st July, 2021 - <https://indico.cern.ch/event/1004432/>

- Organised by: Niklas Beisert, Valerie Domcke, Astrid Eichhorn, Kai Schmitz

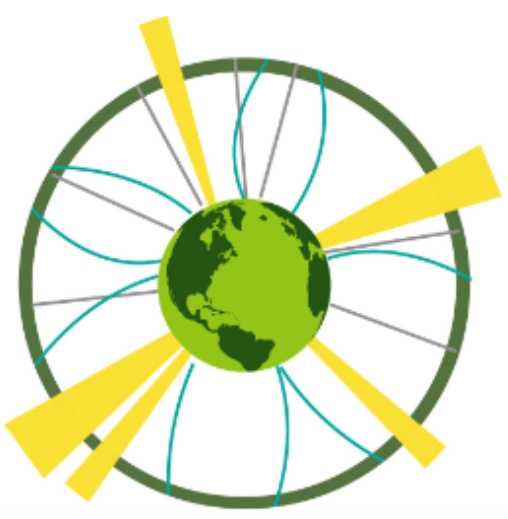
## 2nd Sustainable HEP workshop:

5th - 8th September, 2022 - <https://indico.cern.ch/event/1160140/>

- Organized by Ayan Paul, Melissa Kathryn Quinnan, Peter Millington, Shankha Banerjee, Valerie Lang

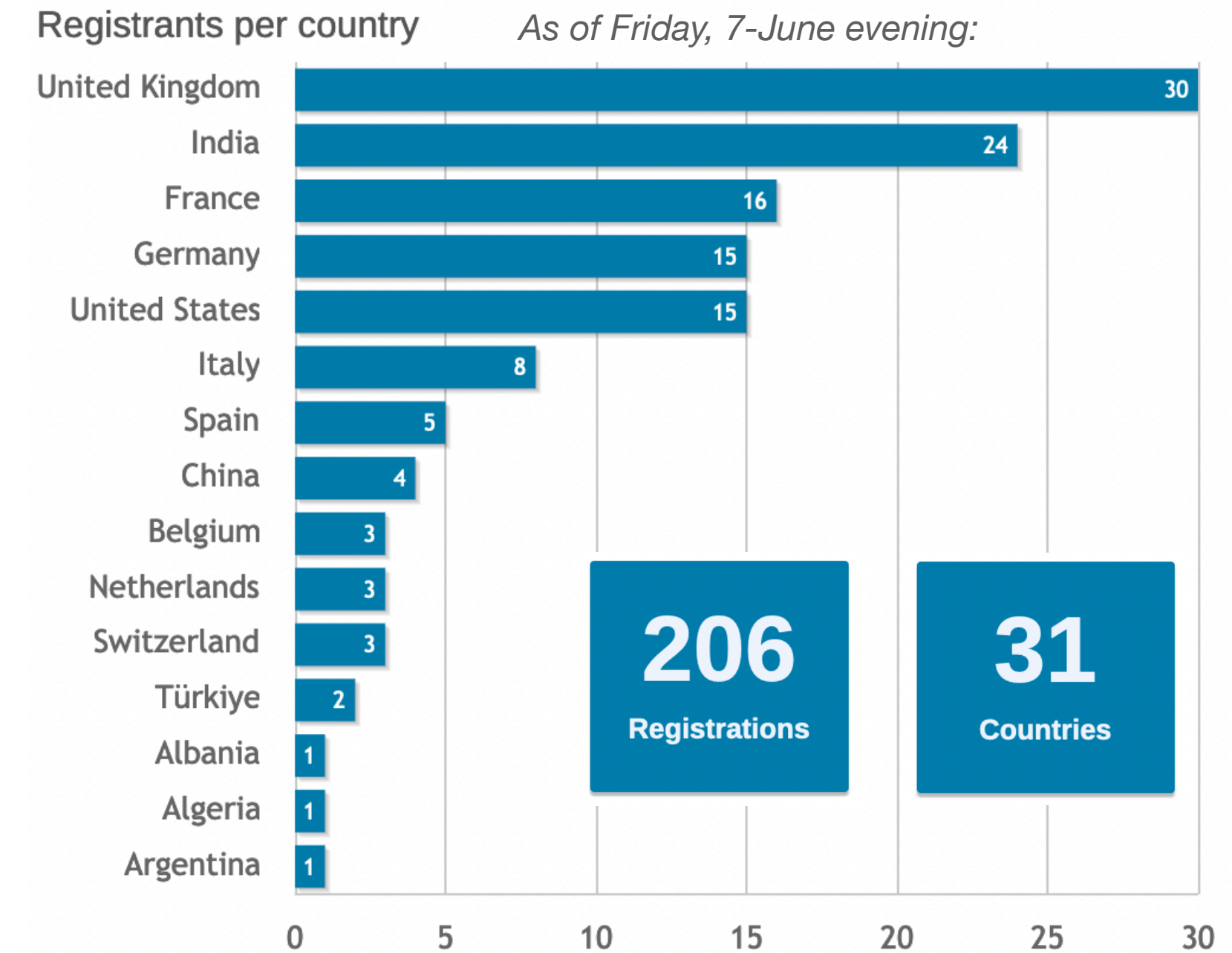
- **Community initiatives:** Sustainability in High-energy, Cosmology, Astro (Particle) Physics - HECAP <https://sustainable-hecap-plus.github.io>
- Mattermost channel for further discussions (during and after the workshop) - <https://mattermost.web.cern.ch/sustainable-hep/channels/town-square>

# Goal of the workshop

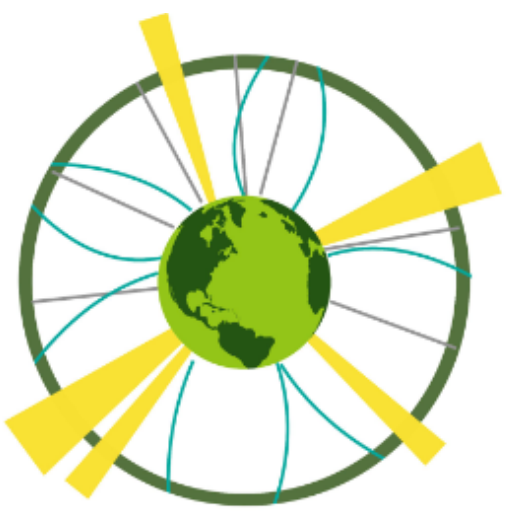


- > 200 registered participants across 31 countries
- 31 speakers + Workshop

- Increase awareness on the **impact and the psychology of climate-change**,
- Cover the intersection of high-energy-physics experiments (HEP) and climate crisis,
- Highlight the **sustainable initiatives ongoing within HEP community and outside**,
- Facilitate discussions about future detector technologies, green computing, sustainable facilities etc.
- **Deliver positive tangible steps forward.**



# Sustainability Context



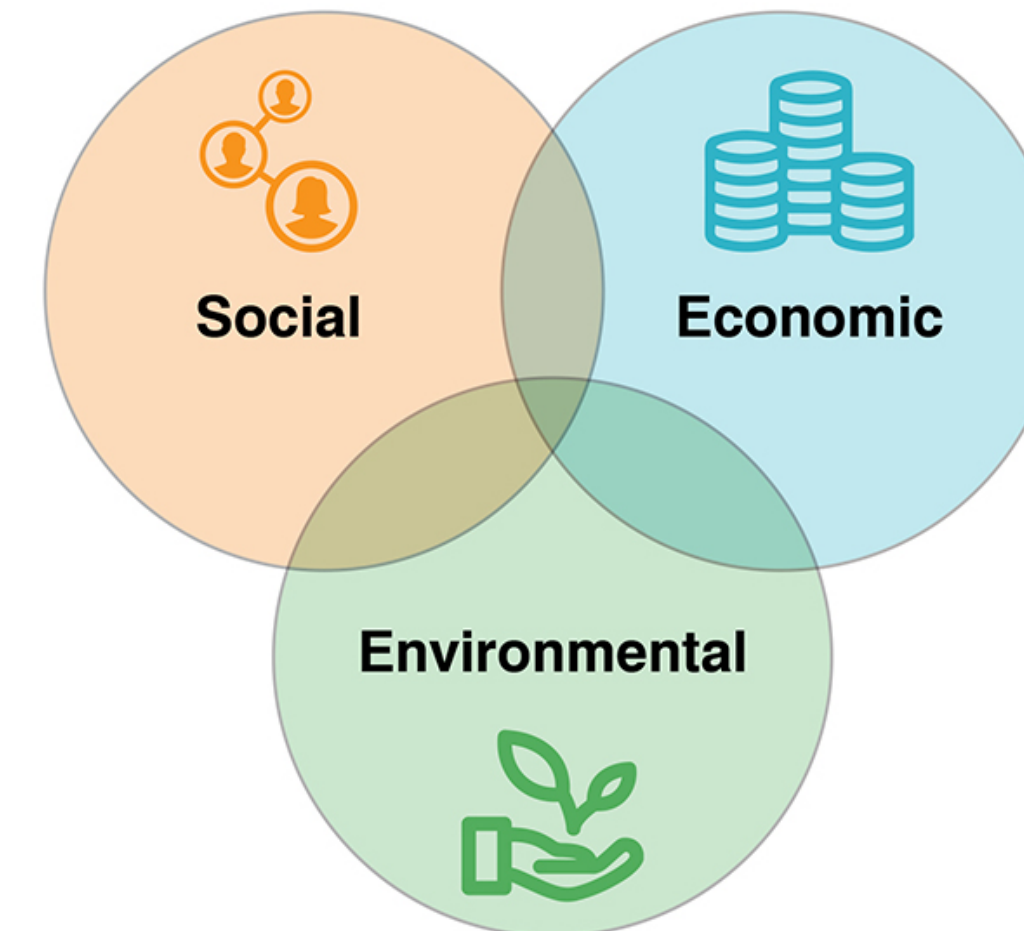
## Sustainability/Sustainable development:

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 usually has three aspects:

**Environmental,**      **Social,**      **Economic.**

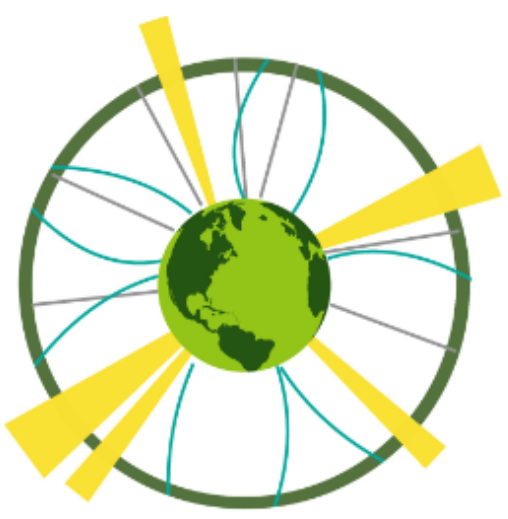


Pollution, **Climate change,** Loss of biodiversity, etc....

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

*One of the main focuses on this workshop...*

# Sustainability Context



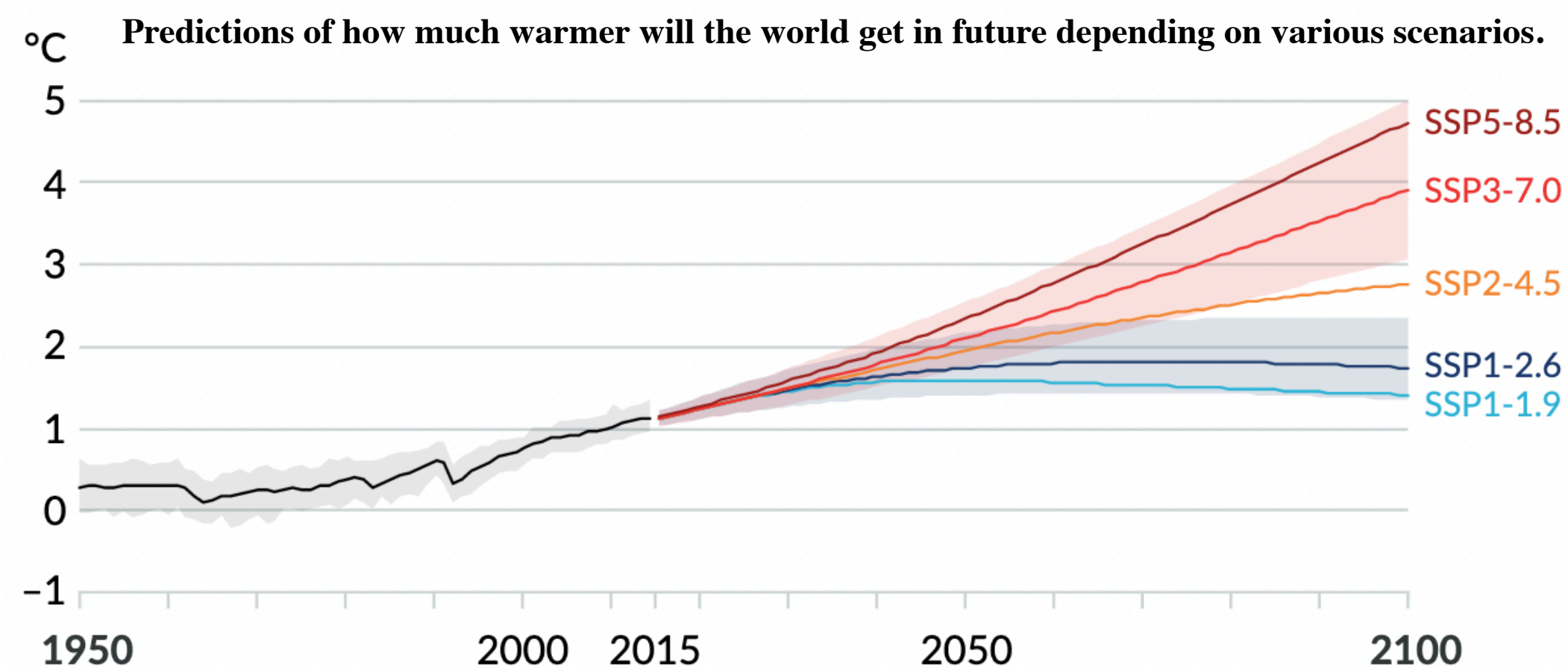
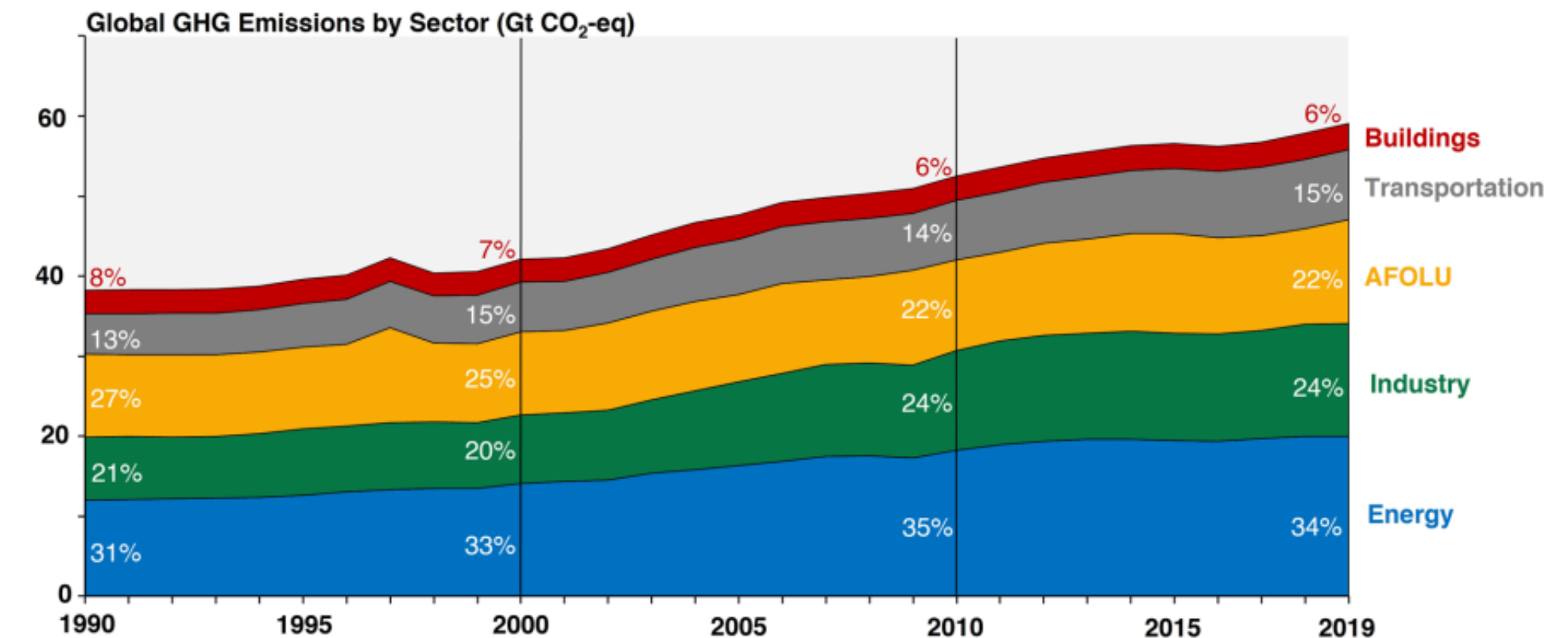
[Ref: Philosophical Magazine and Journal of Science 41 (251) (1896) 237–276.]

## In 1896: First study of heating of Earth's surface observed since pre-industrial era due to CO<sub>2</sub>.

- This study discussed the effect of **greenhouse gases (GHGs)** on the climate.
- Greenhouse gases trap some of the heat that results when sunlight heats the Earth's surface.
- Three important greenhouse gases are: **carbon dioxide (CO<sub>2</sub>)**, **water vapor**, and **methane**.
- **Human activities, such as burning of fossil fuels (coal, oil, gasoline etc), deforestation, agriculture, transport, etc are one of the direct contributors of GHGs.**

*The year 2023 was the warmest year since global records began in 1850!!!!*

*Image from EPA website;  
More details in IPCC (2022) AR6, WG3, Ch 2*



Ref: IPCC (2021) AR6, WG1, SPM Fig. 8a

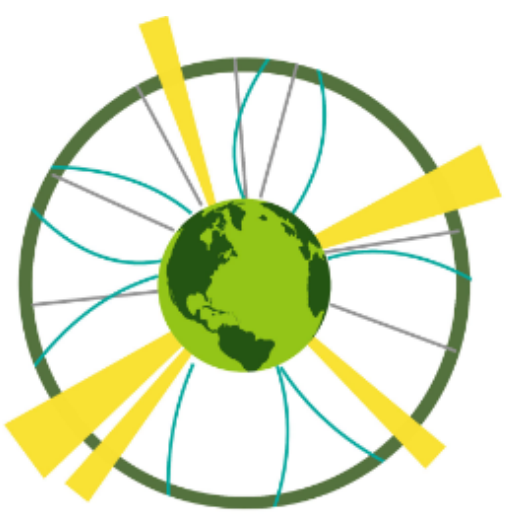
## Global international initiative undertaken:

such as [the Paris-Agreement in 2015](#) - international treaty to combat climate change, signed by 196 UN parties.

## Scientific Organisations such as:

e.g. the [IPCC \(Intergovernmental Panel on Climate Change\)](#) are providing scientific assessments of climate change, its impacts etc. Its reports inform policy decisions at national and international levels

# High Energy Physics (HEP) + Sustainability



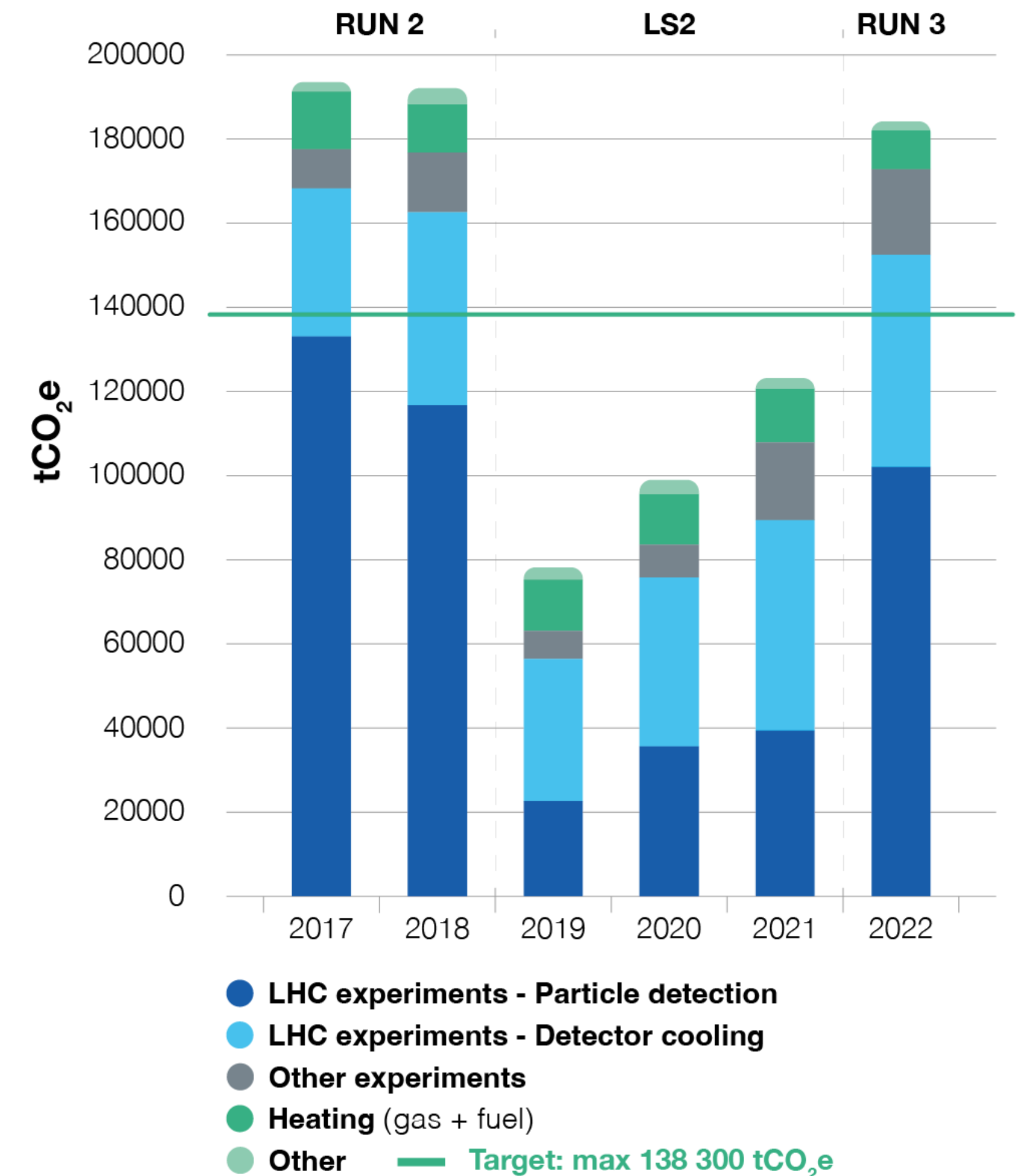
## Where does high energy physics intersect with emissions of GHGs?

Some of the cases are:

- Construction of facilities,
- Gaseous detector,
- Computing,
- Travel
- .....

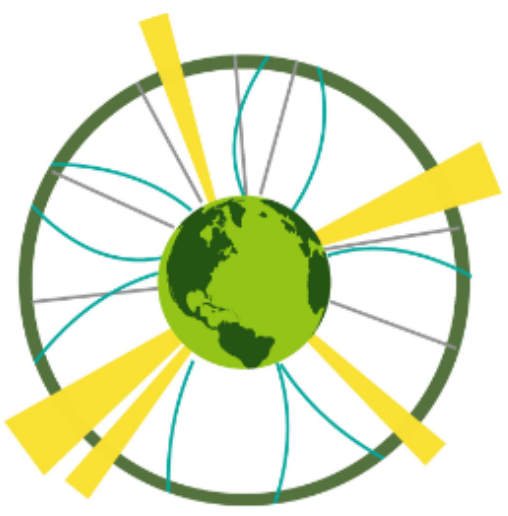
### Aim:

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



Ref: [CERN HSE report](#)

# Workshop Agenda



- **Invited Talks (Plenary):** Climate change and its psychology, HEP and just, best practices in HECAP+ .

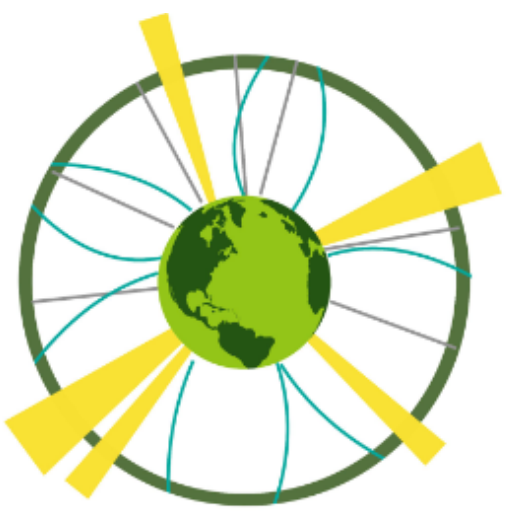
Monday, 10 June	Tuesday, 11 June	Wednesday, 12 June
<b>Keynote Speech on Climate Change:</b> Prof. (Dr.) Jyoti K Parikh  Intersection of HEP and the climate: Prof. Veronique Boisvert  Computational science and sustainability: Dr. Loïc Lannelongue	Overview on sustainable accelerators: Prof. Masakazu Yoshioka  Contribution from the IOP PABG - Sustainable Accelerator R&D in the UK: Dr. Ben Shepherd  Psychology of Climate Change: Dr. Thijs Bouman	Industrial scale involvement on sustainability development (Industry: ARUP): Suzanne Evans  Best Practice in HECAP+: Dr. Ayan Paul

- **Submitted Talks (Parallel):** Contributions on various topics such as future accelerators, detectors, sustainable facilities and computation.

Monday, 10 June	Tuesday, 11 June	Wednesday, 12 June
Parallel-A: <b>Computation</b> Parallel-A: <b>Detectors in large-scale HEP experiments</b>  Parallel-B: <b>Climate crisis mitigation efforts in non-HEP fields</b>	Parallel-A: <b>Accelerators</b>  Parallel-B: <b>Large scale facilities in HEP</b>	<i>No parallel sessions</i>

# Workshop Agenda

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- **Workshop - Know your footprint - 12th June, 15:20 - 16:20 CET**, by **Dr. Naman Kumar Bhalla**

For efficient **carbon footprint calculator** workshop session, please be prepared with a list of your business trips from the past year with the following information:

1. Primary mode of transport used for the commute to and from the venue
2. Number of nights stayed in hotel or any other accommodation
3. Number of workdays the event venue was occupied for
4. Whether there were compensations made for carbon emissions of flights

- **Mattermost Discussion Forum:**

- Sign up for the mattermost team here: [https://mattermost.web.cern.ch/signup\\_user\\_complete/?id=idao6kzxsby1xrr8gkfti4q7wy&md=link&sbr=su](https://mattermost.web.cern.ch/signup_user_complete/?id=idao6kzxsby1xrr8gkfti4q7wy&md=link&sbr=su)
- Join at the channel: <https://mattermost.web.cern.ch/sustainable-hep/channels/town-square>

- **Themed issue in Phil Trans A.**

- After the workshop we will invite all speakers to contribute a brief summary of their contribution to be published as a themed issue in Philosophical Transactions of the Royal Society A. [Kindly let us know susthep24@physics.ox.ac.uk](mailto:susthep24@physics.ox.ac.uk) if you are interested.

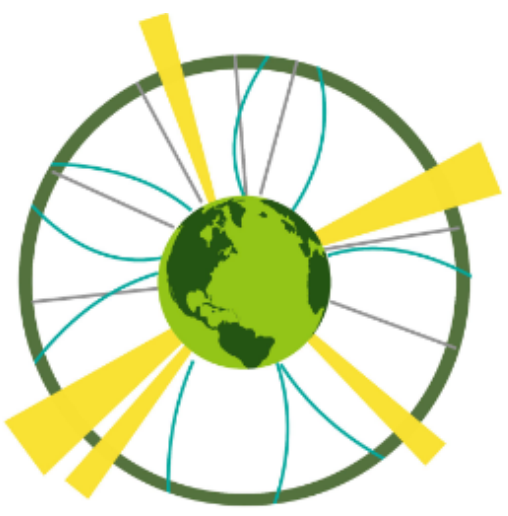
- **Recordings:** All live talks will be recorded and made available in the website after the end of the workshop

For any suggestions, issues, feedback etc. write to us [susthep24@physics.ox.ac.uk](mailto:susthep24@physics.ox.ac.uk)



# Code of Conduct

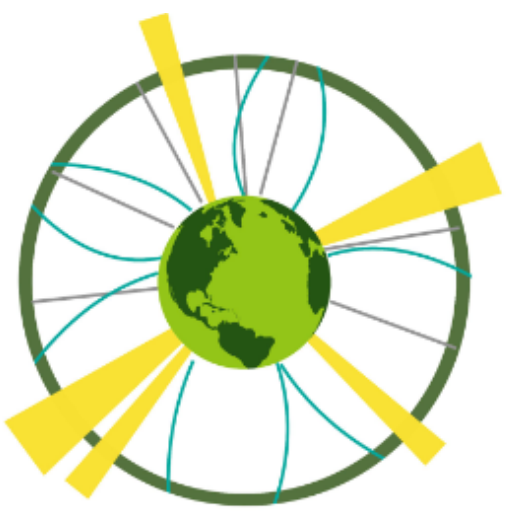
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- **Participants are encouraged to include their full name and preferred pronouns in their Zoom display name.**
- **Participants should ensure that their microphones are muted when they are not speaking**, and the raise-hand button (👋) or chat window (💬) should be used to attract the attention of session chairs.
- **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 workshop.
- **All participants are expected to act with sensitivity toward the many distressing and ongoing troubles around the world.**

# Acknowledgement

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## International Advisory Committee:

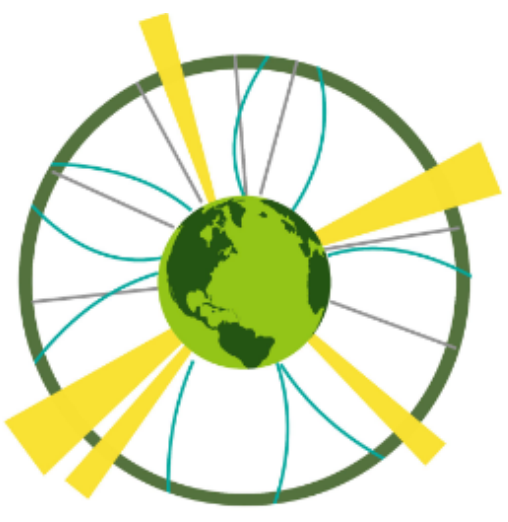
- SHANKHA BANERJEE - Institute of Mathematical Sciences (IMSC), India
- NIKLAS BEISERT - ETH Zurich (University in Zürich), Switzerland
- VALERIE DOMCKE - European Organization for Nuclear Research (CERN), Switzerland
- VALERIE LANG - University of Freiburg, Germany
- PETER MILLINGTON - University of Manchester, UK
- AYAN PAUL - Northeastern University, US

## Website Host:

The John Adams Institute for Accelerator Science, Particle Physics Department of the University of Oxford.

**Zoom Host:** CERN (User licence)

# Meet the organisers



Juliette Alimena (DESY)



Brendon Bullard (SLAC)



Daniel Britzger (MPP)



Hannah Wakeling (Oxford)



Shreya Saha (Adelaide)



Shreyasi Acharya (INFN Bari)