

My Two-Cents on Interdisciplinary Collaboration

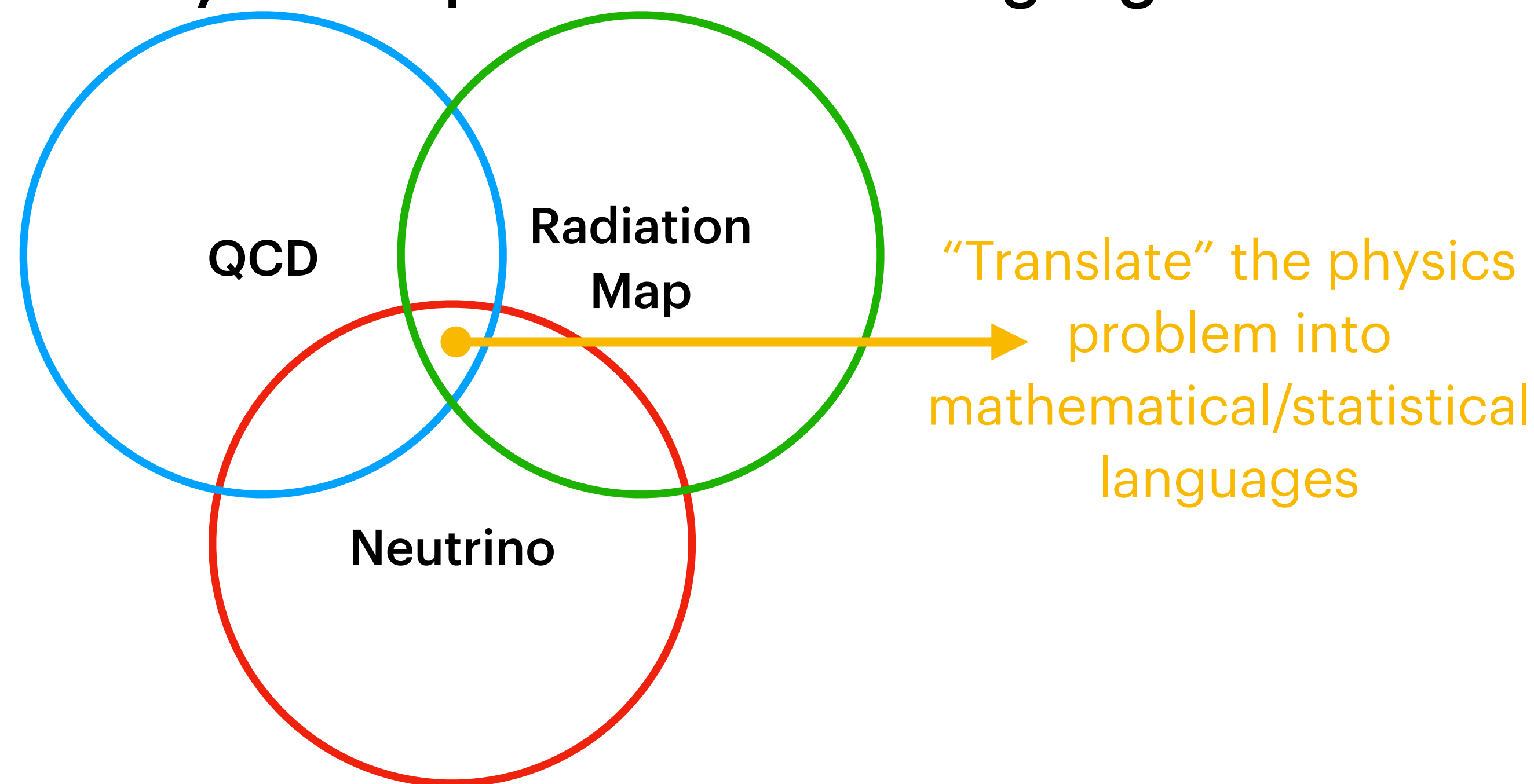
Aobo Li

Self Introduction

- Aobo Li
- Assistant Professor at UC San Diego
 - Coming from a Physics background
 - Joint Appointment: 50% Halicioglu Data Science Institute (Primary), 50% Physics
 - Research: AI for Rare Event Search (neutrino, dark matter)

What's the key of interdisciplinary collaboration?

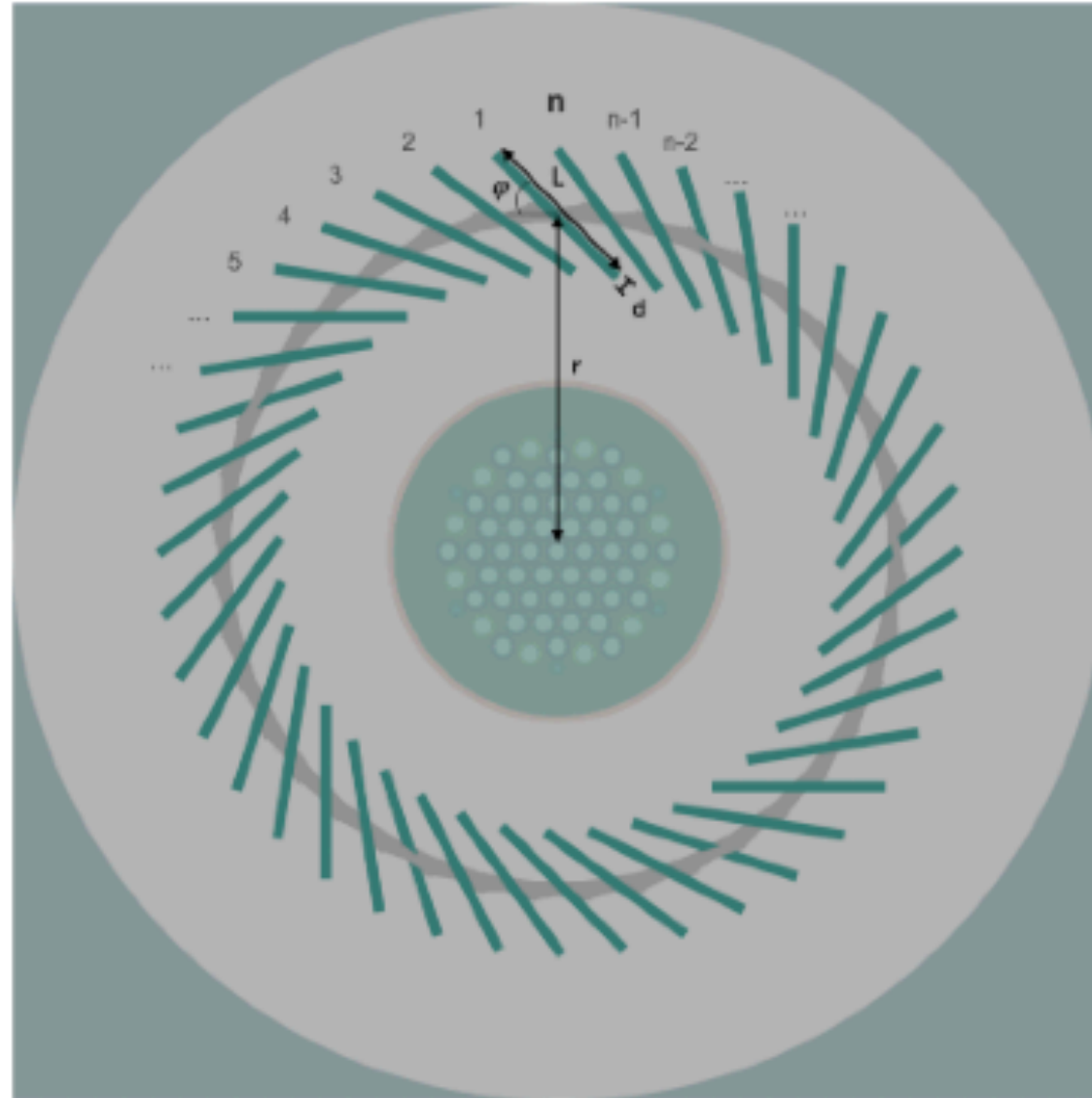
In my opinion, the key is to “speak the same language”



	$0\nu\beta\beta$ Detector Optimization	$0\nu\beta\beta$ Background & Fit	QGP Collider Monitoring	QGP Analysis	Radiation Map Enhancement	Radiation Map UQ
Bayesian Transfer Learning				✓	✓	
Bayesian Multi-Fidelity Learning	✓○			✓	✓	
Langevin Monte Carlo		✓○		✓		✓○
Bayesian Manifold Learning	○			○		
Bayesian Optimization	○					○
Boundary-Informed Surrogates	○			○		
Bayesian Image Change Detection			○			

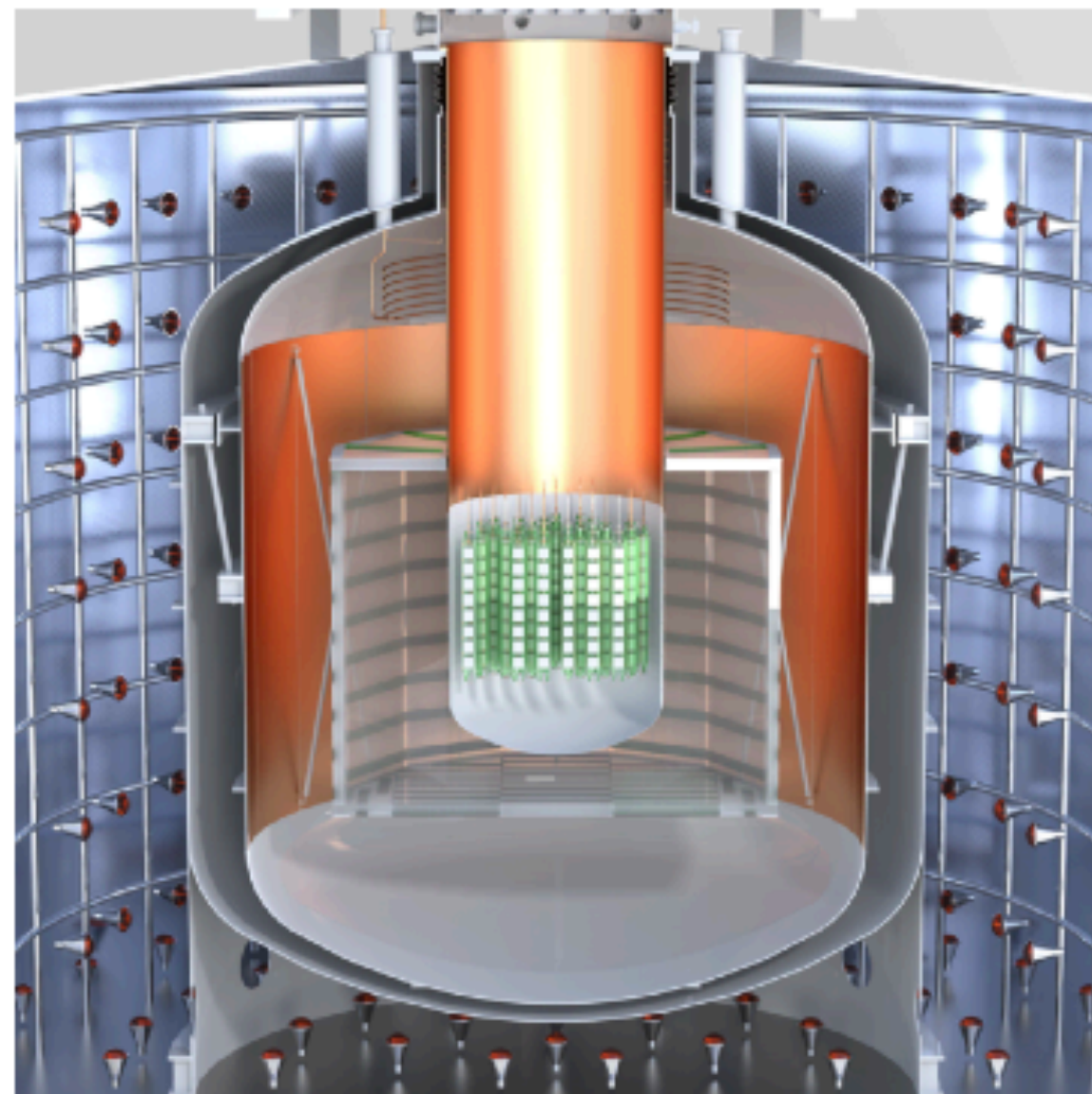
✓: BUQ Phase 1 ○: BUQ Phase 2

An Example...



Design
Parameter

θ

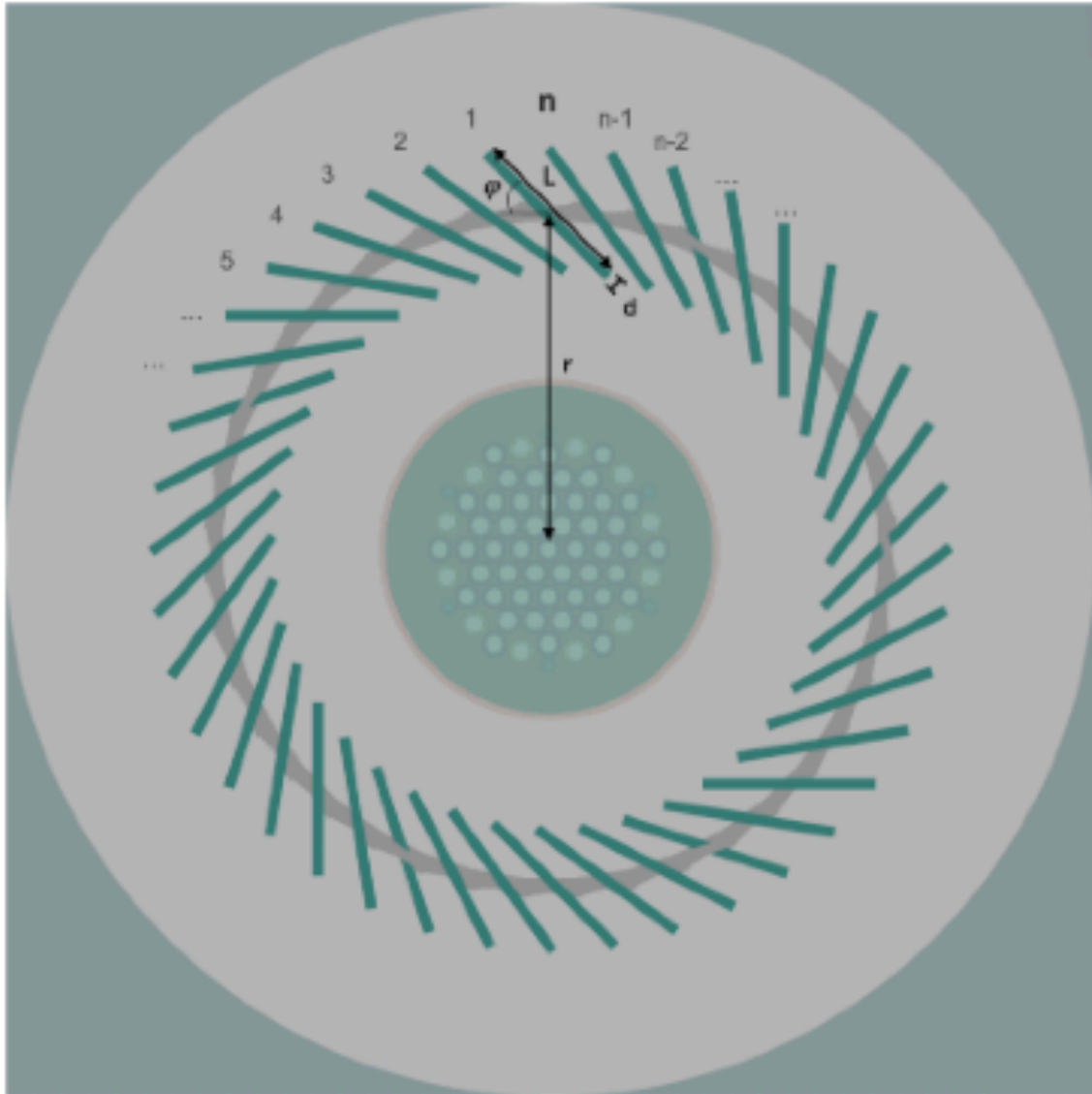


Neutron-specific
Parameter (Energy,
Position,
Momentum)

ϕ

N neutron
simulated, m
entered the
detector

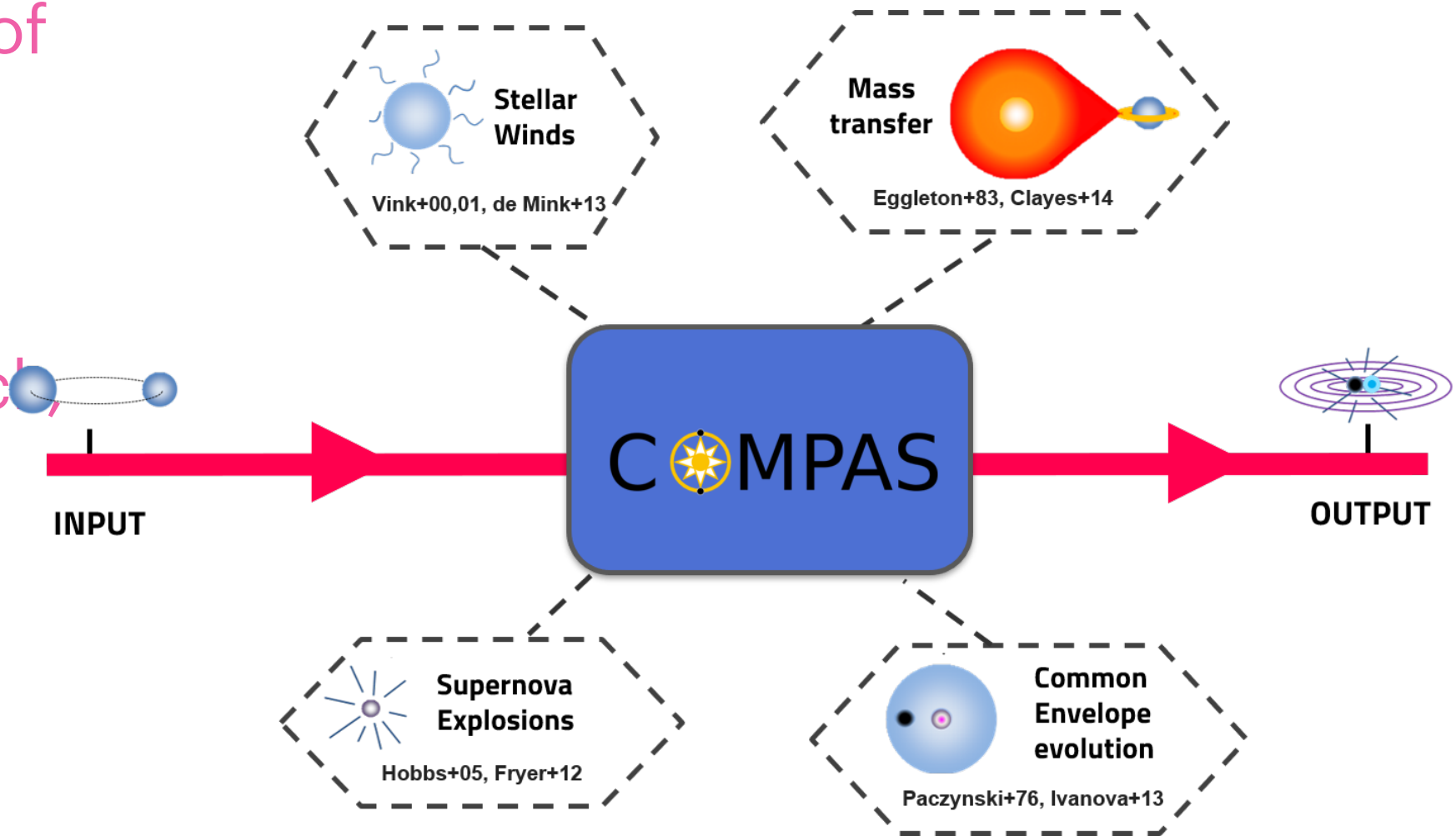
$$y = m/N$$



Design
Parameter

θ

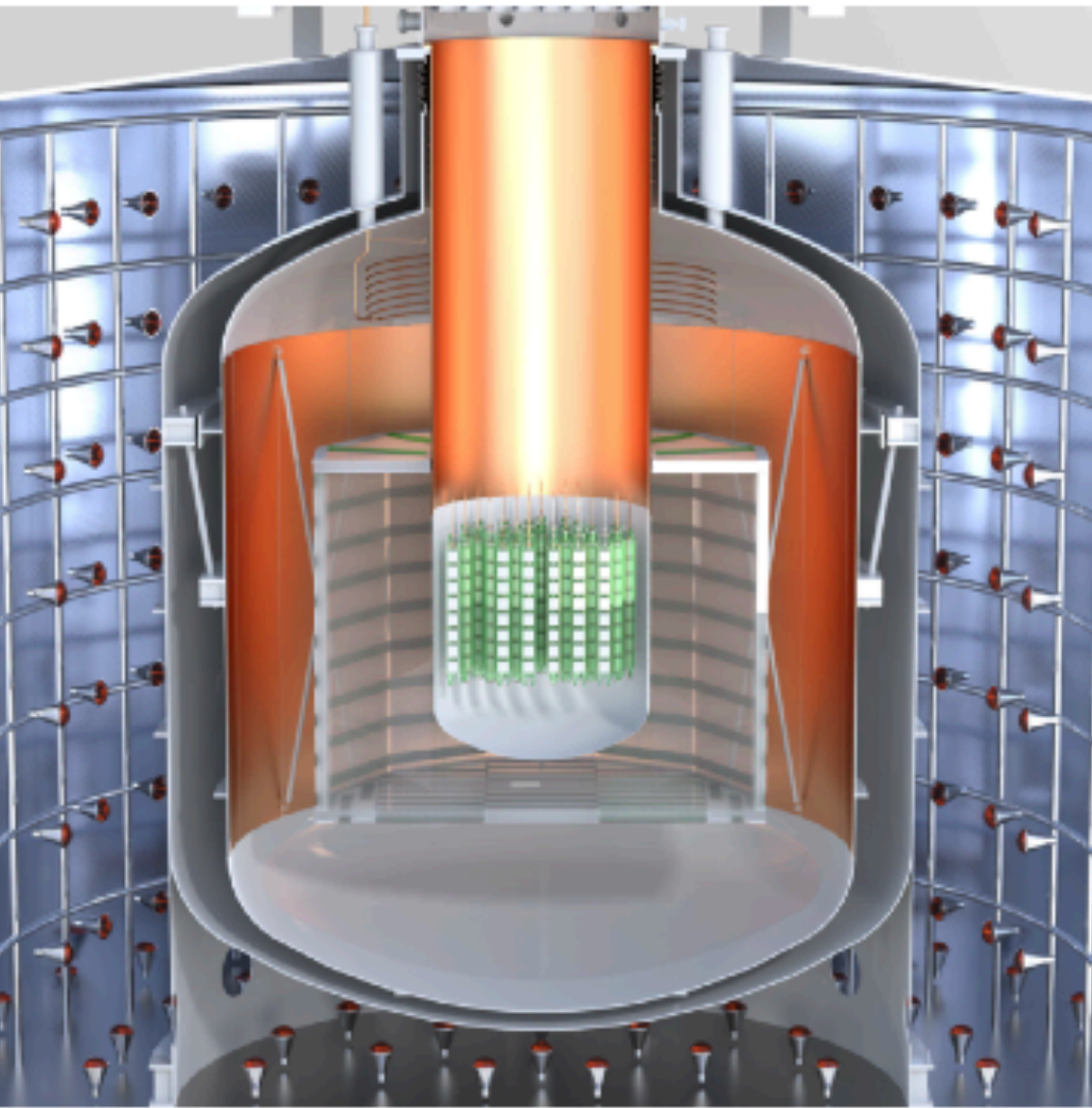
BBH Parameter of
interest
(metallicity,
envelope
efficiency, BH kick,
NS kick)



Neutron-specific
Parameter (Energy,
Position,
Momentum)

ϕ

Other 26
parameters that
are not interesting

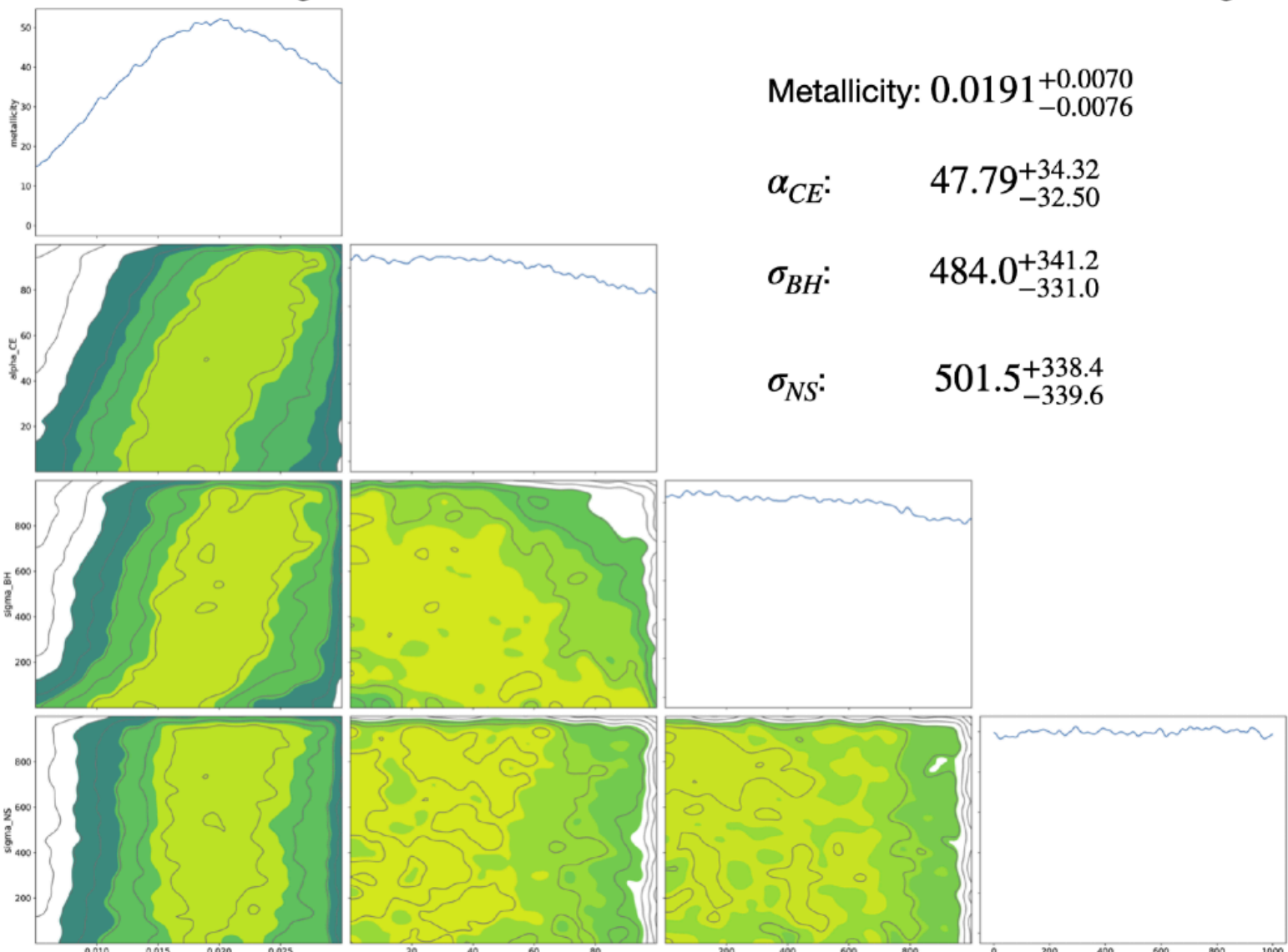


N neutron
simulated, m
entered the
detector

$$y = m/N$$

N Binaries
simulated, m
merger happened

Plot credit: A. Shuetz



A few questions that could help “translating” the problem

- If you want to build a model, what would be the **input** and **output**?
- What’s the challenge we need to deal with in **input data**?
 - e.g. domain shift, long tail distribution, multimodal datasets
- What **additional functionalities** that we want our model to have?
 - Incorporating additional prior info with Bayesian methods
 - Uncertainty quantification
 - Active Learning

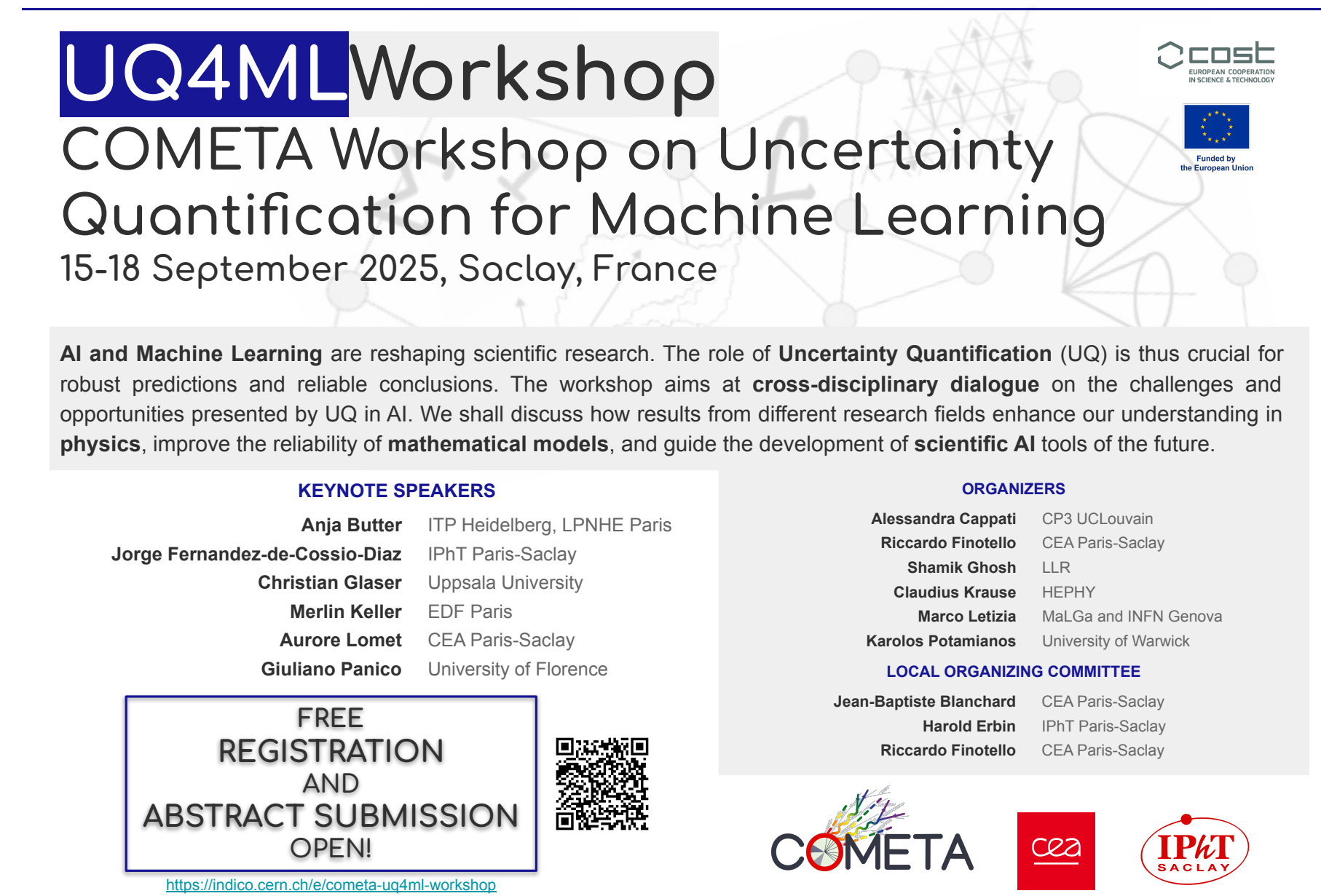
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Bayesian Optimization	○					○
Boundary-Informed Surrogates	○			○		
Bayesian Image Change Detection			○			

✓: BUQ Phase 1

○: BUQ Phase 2

Making Conference/Workshop Presence

- Making presence at conferences/workshop
 - Separately with many contributed talks
 - Give a joint invited talk to cover all the works
 - Workshop has a deadline which will push us
- Upcoming workshops:
 - **UQ4ML** (credit: Raymond Ehlers)
 - **NeurIPS 2025** at San Diego
 - It has a **machine learning for physical science (ML4PS)** workshop
 - **DNP 2025** at Chicago
 - Final ddl for submission got extended to July 18th.



UQ4ML Workshop
COMETA Workshop on Uncertainty
Quantification for Machine Learning
15-18 September 2025, Saclay, France

AI and Machine Learning are reshaping scientific research. The role of **Uncertainty Quantification (UQ)** is thus crucial for robust predictions and reliable conclusions. The workshop aims at **cross-disciplinary dialogue** on the challenges and opportunities presented by UQ in AI. We shall discuss how results from different research fields enhance our understanding in **physics**, improve the reliability of **mathematical models**, and guide the development of **scientific AI** tools of the future.

KEYNOTE SPEAKERS

Anja Butter	ITP Heidelberg, LPNHE Paris
Jorge Fernandez-de-Cossio-Diaz	IPhT Paris-Saclay
Christian Glaser	Uppsala University
Merlin Keller	EDF Paris
Aurore Lomet	CEA Paris-Saclay
Giuliano Panico	University of Florence

ORGANIZERS

Alessandra Cappati	CP3 UCLouvain
Riccardo Finotello	CEA Paris-Saclay
Shamik Ghosh	LLR
Claudius Krause	HEPHY
Marco Letizia	MaLga and INFN Genova
Karolos Potamianos	University of Warwick

LOCAL ORGANIZING COMMITTEE

Jean-Baptiste Blanchard	CEA Paris-Saclay
Harold Erbin	IPhT Paris-Saclay
Riccardo Finotello	CEA Paris-Saclay

FREE REGISTRATION AND ABSTRACT SUBMISSION OPEN!

<https://indico.cern.ch/e/cometa-uq4ml-workshop>

COMETA CEA IPhT Saclay

NeurIPS 2025

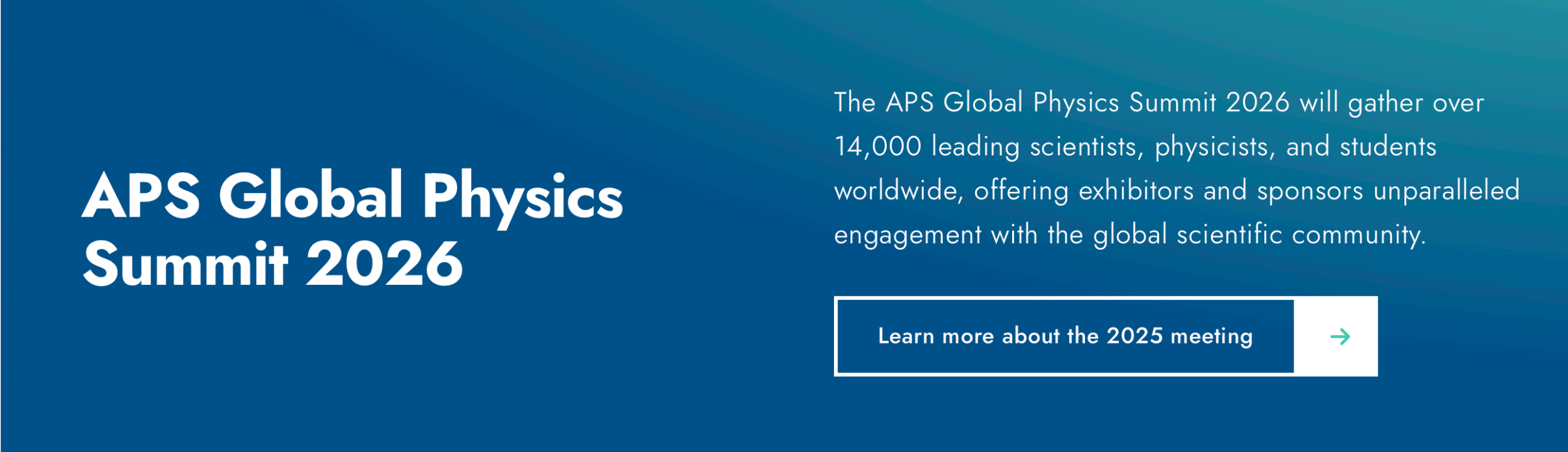
The Thirty-Ninth Annual Conference on Neural Information Processing Systems

San Diego Convention Center

Tuesday Dec 2nd through Sunday Dec 7th

Making Conference/Workshop Presence

- **APS Global Summit 2026** at Denver
 - I was elected this week as Program Committee co-chair of Group of Data Science
 - Organize the April Meeting part of GDS
 - Could potentially secure 1-2 invited talk for our group
- **Organizing our own workshops:**
 - 2026 Ovbb AI summer school discussed among neutrino PIs
 - All major AI conferences (NeurIPS/ICLR/ICML) are open to workshop proposal submissions
 - Can be competitive
 - We could potentially aim to host a “Bayesian for Science” workshop in 2026/2027



The APS Global Physics Summit 2026 will gather over 14,000 leading scientists, physicists, and students worldwide, offering exhibitors and sponsors unparalleled engagement with the global scientific community.

APS Global Physics Summit 2026

Learn more about the 2025 meeting →

Join us March 15-20, 2026, at the Colorado Convention Center, Denver, CO.

ICLR 2025 - Call for Workshops

List of accepted workshops at ICLR 2025: https://openreview.net/group?id=ICLR.cc/2025/Workshop_Proposals

Following the ICLR 2025 main conference, **two days** of in-person workshops on a variety of current topics will be held on **April 27 and 28, 2025** in **Singapore**. We invite researchers interested in chairing a workshop to submit proposals. Workshop organizers have several responsibilities, including coordinating workshop participation and content, publicizing and providing the program in a timely manner, and moderating the program throughout the workshop.

Goal of ICLR Workshops

Workshops provide an informal, cutting edge venue for discussion of works in progress and future directions. Good workshops have helped to crystallize common problems, explicitly contrast competing frameworks, and clarify essential questions for a subfield or application area. Workshops are a structured means of bringing together people with common interests to form communities. Good workshops should include some form of community building.

Each workshop is a single-day, in-person event, split into morning and afternoon sessions, with free time between the sessions for individual exchange. Workshop topics should include, but are not limited to, the following:

- Deep learning / representations learning for scientific discovery
- Theoretical foundations of deep learning
- Fairness in machine learning, transparency, governance and inclusion
- Implementation issues, parallelization, software platforms, hardware
- Learning in low-resource settings
- Optimization for representation learning
- Privacy in deep learning
- Robustness and adversarial learning
- Uncertainty in representation learning
- Generative AI and large language models
- Important Applications in vision, audio, speech, multilingual contexts, robotics, neuroscience, healthcare, climate change, agriculture, pandemic response, societal and policy impact, or any other field, as well as any other topic relevant to an appreciable fraction of the ICLR community.

Detailed descriptions of previous workshops may be found in last year's online schedule (<https://blog.iclr.cc/2024/01/08/announcing-the-accepted-workshops-at-iclr-2024/>). Workshop schedules should encourage lively debates, stimulate the production of new ideas and foster discussion of important issues. Every group considering submitting a workshop proposal should read the [Guidance for ICLR Workshop Proposals 2025](#), which describes important considerations for hosting workshops, includes templates of previous successful proposals, details the selection criteria and process, describes what is considered a conflict of interest, and includes other frequently asked questions.