The Abdus Salam
International Centre for Theoretical Physics

IAEA
International Atomic Energy Agency

unesco
United Nations
Educational, Scientific
and Cultural Organization

60 ICTP
1964–2024

Workshop on Classical and Quantum Machine Learning for Condensed Matter Physics

Description:

This workshop aims to provide an overview of machine learning (ML) and quantum computing (QC) techniques, in particular, to solve condensed matter physics problems. The workshop will also give the participants a hands-on experience of some useful ML+QC packages.

MORE DETAILS:

In recent years, classical ML techniques have been applied to analyze vast datasets, uncover hidden patterns, and predict material properties with unprecedented accuracy. Concurrently, the advent of QC promises to revolutionize the field by harnessing the computational power of quantum computers to tackle complex quantum many-body problems.

In this workshop, we will listen to some presentations from leading researchers and young researchers who have been exploring classical ML, quantum ML, and other quantum-related research, which could be beneficial for the development of condensed matter physics. During the workshop, participants will also be equipped with hands-on sessions for learning cutting-edge tools of quantum ML.

TOPICS:

- Classical machine learning approaches for condensed matter physics, such as supervised and unsupervised learning, deep learning, and reinforcement learning
- Applications of classical machine learning in materials discovery, phase transitions, electronic structure prediction, and beyond
- Quantum computing and quantum machine learning algorithms, along with their potential to address fundamental challenges in physics and engineering, particularly in condensed matter physics, including simulating quantum many-body systems and solving optimization problems
- Hybrid classical-quantum computing techniques for enhancing computational efficiency and accuracy
- Challenges and limitations in applying machine learning techniques to physics problems
- Future prospects and directions for advancing the synergy between classical and quantum techniques, especially in condensed matter physics research

SPEAKERS:

Khoirul ANWAR, Telkom University, Indonesia
Cica GUSTIANI, Sorbonne Université, France
Muhammad Yusrul HANNA, BRIN, Indonesia
Mingda LI, MIT, USA
Andriyan B. SUKSMONO, ITB, Indonesia

The accepted participants will be provided with the Zoom meeting link and Discord community invitation through their emails by June 12, 2024

19 - 21 June 2024

Online

**Deadline:
5 June 2024**

DIRECTORS:

Muhammad Aziz MAJIDI, UI, Indonesia
Ahmad Ridwan Tresna NUGRAHA, BRIN, Indonesia
Agustinus Agung NUGROHO, ITB, Indonesia
Edi SUPRAYOGA, BRIN, Indonesia
Sasfan Arman WELLA, BRIN, Indonesia

LOCAL ORGANISER:

Ali HASSANALI, ICTP, Italy

REGISTRATION:

There is no registration fee.

FURTHER INFORMATION:

E-mail: smr3948@ictp.it

Web: https://indico.ictp.it/event/10486/

Female scientists are encouraged to apply.

BRIN
BADAN RISET
DAN INOVASI NASIONAL