

## Special Issue

# Symmetry/Asymmetry in Quantum Computing and Quantum Machine Learning Algorithms for High Energy Physics

### Message from the Guest Editors

Quantum computing was postulated in the early 1980s as way to perform computations that would not be tractable with a classical computer. With the advent of noisy intermediate-scale quantum computing devices, more quantum algorithms are being developed with the aim of exploiting the capacity of the hardware for machine learning applications. An interesting question is whether we will be able to develop quantum algorithms that will be able to outperform those classical machine learning algorithms used by the HEP community for decades. The High Energy Physics community used classical machine learning algorithms to address a wide variety of challenging problems, including searches for the Higgs boson and physics beyond the standard model. This Special Issue aims to gather the latest developments in quantum machine learning algorithms to address challenging problems in particle physics, such as particle classification, track and vertex reconstruction, and physics simulation, beyond the standard model searches and quantum entanglement.

### Guest Editors

Prof. Dr. Kamal Benslama

Experimental Particle Physics Group, Drew University, Madison, NJ, USA

Dr. Samuel Yen-Chi Chen

Computational Science Initiative, Brookhaven National Laboratory, New York, NY 11973-5000, USA

### Deadline for manuscript submissions

closed (10 June 2023)



## Symmetry

an Open Access Journal  
by MDPI

Impact Factor 2.2  
CiteScore 5.3



[mdpi.com/si/100046](https://mdpi.com/si/100046)

*Symmetry*  
Editorial Office  
MDPI, Grosspeteranlage 5  
4052 Basel, Switzerland  
Tel: +41 61 683 77 34  
[symmetry@mdpi.com](mailto:symmetry@mdpi.com)

[mdpi.com/journal/  
symmetry](https://mdpi.com/journal/symmetry)





# Symmetry

---

an Open Access Journal  
by MDPI

---

Impact Factor 2.2  
CiteScore 5.3



[mdpi.com/journal/  
symmetry](https://mdpi.com/journal/symmetry)



## About the Journal

### Message from the Editor-in-Chief

Symmetry is ultimately the most important concept in natural sciences. It is not surprising then that very basic and fundamental research achievements are related to symmetry. For instance, the Nobel Prize in Physics 1979 (Glashow, Salam, Weinberg) was received for a unified symmetry description of electromagnetic and weak interactions, while the Nobel Prize in Physics 2008 (Nambu, Kobayashi, Maskawa) was received for the discovery of the mechanism of spontaneous breaking of symmetry, including CP symmetry. Our journal is named *Symmetry* and it manifests its fundamental role in nature.

---

### Editor-in-Chief

Prof. Dr. Sergei Odintsov

1. ICREA, 08010 Barcelona, Spain

2. Institute of Space Sciences (IEEC-CSIC), C. Can Magrans s/n, 08193 Barcelona, Spain

---

### Author Benefits

#### Open Access:

free for readers, with article processing charges (APC) paid by authors or their institutions.

#### High Visibility:

indexed within SCIE (Web of Science), Scopus, CAPus / SciFinder, Inspec, Astrophysics Data System, and other databases.

#### Journal Rank:

JCR - Q2 (Multidisciplinary Sciences) / CiteScore - Q1 (General Mathematics)