

Proposal for an International Year of Quantum Science and Technology

Briefing Note

1. The United Nations General Assembly designates International Years to mark particular subjects in order to promote through awareness and action, the objectives of the Organization. Often these International Years are declared after preliminary endorsement by a United Nations agency such as UNESCO when the subject falls within its domain of expertise.
2. A number of United Nations International Years have been related to scientific themes, aiming to promote the global importance of a particular domain of science in areas such as sustainable development, education, and culture. Amongst the most recent, the International Year of Light and Light-based Technology (2015) and the International Year of the Periodic Table of the Elements (2019) have been highly successful, reaching audiences of millions worldwide of all ages with many thousands of events at all level. In addition to awareness raising and public outreach, these International Years have led to improved understanding and new partnerships between scientists and decision makers, and new initiatives in research and education.
3. A central concept that underpins all areas of science is the physical nature of matter itself and how it can be described on microscopic atomic and sub-atomic scales. Although it may seem impossible to develop an understanding of a regime that we cannot observe directly, this is precisely what has been achieved with the development of Quantum Science and Technology. The description of nature known as “Quantum Theory” or “Quantum Mechanics” is now central to all areas of science, cutting across domains including physics, chemistry, biology, and information science, and finding critical applications in fields such as energy, communications, and pharmacology.
4. The year 2025 will mark 100 years since the development of the modern treatment of Quantum Science which has made these extraordinary scientific advances possible. However, although the scientific term “quantum” is familiar to most members of the public and has entered popular culture, it often resonates as something esoteric and difficult to understand. Yet quantum mechanics is the central theory governing our entire physical universe, from the behavior of subatomic particles to the distribution of galaxies in the cosmos. Quantum theory explains how the sun shines in space, and how solar panels work on earth to capture its energy. Quantum science has unlocked the secrets of chemistry and materials, leading to technologies such as integrated circuits, lasers, and compact batteries, which have revolutionized communications and medicine and improved quality of life for billions worldwide. Quantum theory is at the heart of the operation of the LED, which has transformed lighting efficiency, reducing our dependence on fossil fuels and providing new off-grid lighting solutions in poor regions. Recent insights into quantum science have spawned the growing field of quantum information processing and quantum computing for modelling complex systems, with particular potential for modelling and mitigating extreme weather events and climate change.
5. Raising global awareness of the centrality of the quantum theory of nature to science and development motivates this project to proclaim 2025 The International Year of Quantum

- Science and Technology (IYQ 2025).
6. Following the successful example of previous science-themed international years, an International Year of Quantum Science and Technology will see coordinated events on national, regional and local levels, raising awareness of the importance of this theme to broad audiences. There will be a particular focus on stressing the importance of quantum technology and engineering to the United Nations 2030 agenda and its Sustainable Development Goals related to energy, environment, climate, agriculture, health-care, and industrial development.
 7. In this context, we note that the importance of quantum science and technology has already been appreciated in many developed countries, with significant funding initiatives in the European Union, China, the Russian Federation, and the United States. At the same time, however, it is essential that the benefits of quantum technologies are shared globally, and it is vital that all regions of the world develop similar priorities in quantum science and research. A particular focus of the International Year will therefore be on education and the development of global initiatives to inspire and train the next generation of scientists from every region of the world, particularly women and young researchers.
 8. The history of quantum science is part of our shared culture, and showcases the power of education and scientific thought. Moreover, the pioneers of quantum science and technology have also been amongst the pioneers of modern scientific practices such as international collaboration, and the free sharing of scientific information through what is now known as Open Science.
 9. With these considerations, we will be preparing a resolution for the 2023 General Conference of UNESCO and the 2023 General Assembly of the United Nations to proclaim 2025 the International Year of Quantum Science and Technology. This will ensure a full period of 12 months preparation and planning during 2024.
 10. In parallel, an international consortium of multi-disciplinary and multi-sectoral partners is currently being assembled to promote the goals of the International Year, and to prepare for its effective commemoration. It is anticipated that the International Year of Quantum Science and Technology will be integrated within the strategic actions of the International Basic Science Programme (IBSP) of UNESCO, and will link to major UNESCO scientific centres.
 11. A representative list of Key supporting organizations to date for the APS proposal for the International Year of Quantum Science & Technology is here organized by region:

AFRICA

- African Academy of Sciences (AAS)
- African Physical Society (AfPS)
- South African Institute of Physics (SAIP)

CENTRAL AND SOUTH AMERICA

- Brazilian Physical Society (SBF)
- Venezuelan Physical Society
- Federación Iberoamericana de Sociedades de Física (FEIASOFI)

- Academia de Ciencias de America Latina (ACAL)
- Academia Nacional de Ciencias Exactas, Físicas y Naturales de Argentina (ANCEFN)

NORTH AMERICA

- Mexican Physical Society (SMF)
- American Physical Society (APS)

EUROPE

- German Physical Society (DPG)
- Italian Physical Society (SIF)
- Institute of Physics (IOP)
- French Physical Society (SPS)
- European Physical Society (EPS)
- Max Planck Institute (MPI)
- Swiss Physical Society (SPS)
- United Physical Society of Russian Federation (UPS RF)
- Russian Academy of Sciences (RAS)
- Danish Physical Society (DFS)

ASIA

- Pakistan Academy of Sciences (PAS)
- Indian Physics Association (IPA)

OCEANIA

- New Zealand Institute of Physics (NZIP)
- Dodd-Walls Centre for Photonic and Quantum Technologies

INTERNATIONAL (GLOBAL)

- The World Academy of Sciences (TWAS)
- IUPAP Commission 5
- IUPAP Commission 17
- International Commission for Optics (ICO)