

2025 is the International Year of Quantum Science and Technology

Building awareness and inspiring a future workforce are two aims of the UN-designated quantum year.

Hands-on demonstrations of quantum entanglement, role-playing diplomacy games, continental-scale shindigs, and more activities for the International Year of Quantum Science and Technology (IYQ) are coming into focus. Last June, the United Nations declared 2025 the IYQ; since then, scientists, educators, and science lovers have been buzzing with ideas for how to cel-

ebrate the past century of quantum physics and its applications and look ahead to the next one.

The UN imprimatur lends visibility and legitimacy to efforts to raise awareness about quantum science and technology. It also comes with a commitment to the UN's 17 sustainable development goals—affordable and clean energy, quality education, and gender equality, to name a few. Many quantum-related activities are underway independent of the IYQ, says Enrica Porcari, head of CERN's IT department and a member of the IYQ steering committee. But the IYQ will “turbocharge” efforts, she says.

“I think 2025 will see an explosion of events.”

Quantum-based technologies are already ubiquitous, and many more applications in computing, communications, and sensing are on the horizon. “In physics, everyone understands how central quantum mechanics has become, but that’s not the case for the public,” says Paul Cadden-Zimansky, the physicist at Bard College who set the ball rolling that eventually resulted in the UN declaration and who is an IYQ global coordinator.

The IYQ can be called a success, Porcari says, if by the end of the year,



A DELEGATION headed by Joe Niemela (far right), a scientist emeritus at UNESCO and the Abdus Salam International Centre for Theoretical Physics, rallied support for the IYQ at the United Nations last April. The other delegates were, from left, Yanne Chembo (University of Maryland), American Physical Society president Young-Kee Kim (University of Chicago), and Ana María Cetto (National Autonomous University of Mexico). (Photo courtesy of Joe Niemela.)

people in quantum-underserved countries are saying, “I wouldn’t miss this revolution.”

Global events

The official IYQ launch is scheduled for 4–5 February at UNESCO’s Paris headquarters. The event will introduce the year by focusing on the future of quantum science and technology, says Claudia Fracchiolla, head of public engagement at the American Physical Society, which is one of the six founding sponsors of the IYQ. The event, she says, will focus on questions like, What do policymakers need to think about? How will developments based on quantum physics benefit society? What education and workforce training are needed to prepare for the quantum revolution? What are the ethical considerations? Science ministers, Nobel Prize winners, educators, social scientists, and others will speak at the event.

The IYQ sponsors, which have grown to include a couple dozen professional societies, foundations, universities, and companies from around the world, are planning a global event on each continent. Beyond that, the idea is to galvanize grassroots organization of activities large and small.

In March, the American Physical Society will host activities to celebrate the IYQ before and during its Global Physics Summit in Anaheim, California. Some activities, such as a quantum playground and treasure hunt, will be largely directed toward conference goers, but many will be public facing. Events will include dance and theater performances, art exhibits, an escape room, and a real-time demonstration of Bose–Einstein condensates being synthesized aboard the International Space Station.

One of the global events will likely take place in Ghana, which, along with Mexico, played a key role in bringing

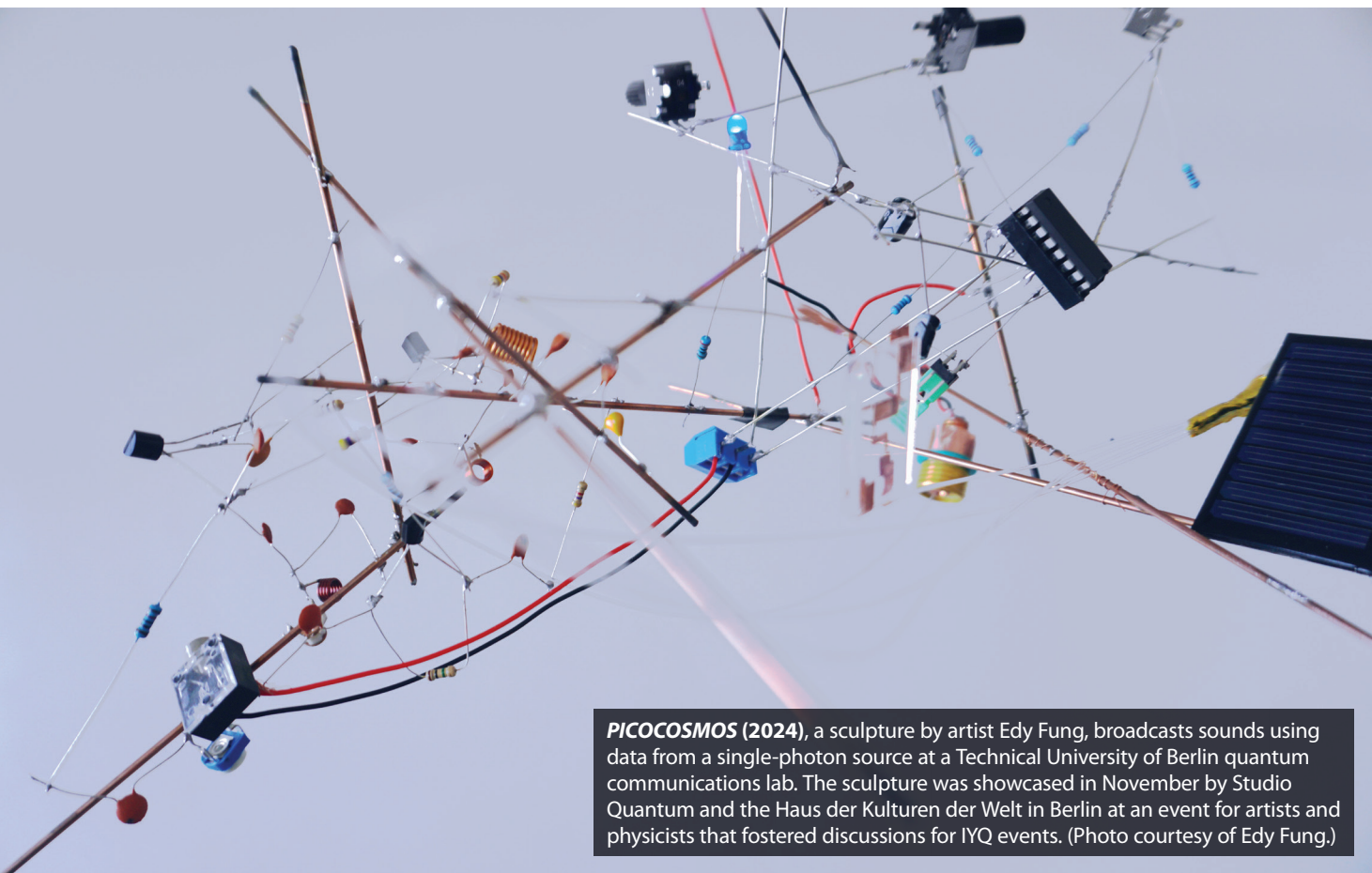


INTERNATIONAL YEAR OF Quantum Science and Technology

the IYQ proposal to the UN. Riche-Mike Wellington, Ghana’s focal person for the IYQ, says that training workshops and conferences, public awareness campaigns, and other activities are being planned in partnership with industry,



IN THE QUANTUM DIPLOMACY GAME, policymakers use role-playing to explore such issues as how to foster public–private partnerships and how to make their government quantum friendly. The game was created by the Geneva-based Open Quantum Institute. (Photo by Michael Chiribau, UNITAR Division for Multilateral Diplomacy.)



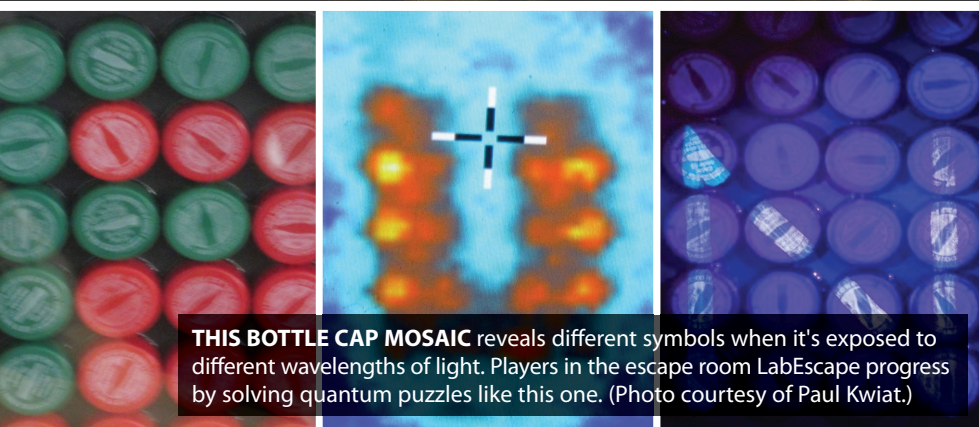
PICOCOSMOS (2024), a sculpture by artist Edy Fung, broadcasts sounds using data from a single-photon source at a Technical University of Berlin quantum communications lab. The sculpture was showcased in November by Studio Quantum and the Haus der Kulturen der Welt in Berlin at an event for artists and physicists that fostered discussions for IQ events. (Photo courtesy of Edy Fung.)



THIS MOSAIC from the 1950s at the National Autonomous University of Mexico explores the past and present. The eastern wall (shown) portrays the contemporary world, with the atom taking center stage. (Photo by Miguel Zorrilla, General Directorate of Libraries and Digital Information Services, National Autonomous University of Mexico.)



IN THE MULTIMEDIA THEATER PIECE *The Art of Questionable Provenance*, scientists and artists explore the science of consciousness and the use of scientific forensics to analyze artwork. The University of Chicago's STAGE Center, which created and produced the show, is planning other projects for the IYQ. (Photo by Christopher Ash.)



THIS BOTTLE CAP MOSAIC reveals different symbols when it's exposed to different wavelengths of light. Players in the escape room LabEscape progress by solving quantum puzzles like this one. (Photo courtesy of Paul Kwiat.)



A LIGHT AND SOUND INSTALLATION by Robert B. Lisek is inspired by quantum field theory calculations. The mathematician and artist created the work last fall as an artist-in-residence at the Science Gallery Bengaluru in India as the gallery geared up for its yearlong IYQ research festival. (Photo courtesy of Robert B. Lisek, <https://robertlisek.com>.)

educators, and policymakers. The aim of IYQ activities, he says, is to “inspire future leaders and innovators in quantum science, driving economic growth and enhancing the quality of life for Ghanaians and Africans at large” and to bridge the “noticeable divide between the technologically rich North and the less-developed South.”

Grassroots activities

In India, physics historian and museum director Jahnvi Phalkey is planning a yearlong quantum festival at Science Gallery Bengaluru. The preparations began last fall with a mathematician-artist who spent several weeks at the gallery creating quantum physics-inspired art. There will be installations, performances, and a beverage bar, called h -bar for Planck's constant. “The purpose is to create a sense of wonderment around quantum, not necessarily to explain it,” says Phalkey. “It's to remind ourselves of the sheer beauty of what the mind is capable of.”

People who have been involved in World Quantum Day, now in its fourth year, have a bit of a head start. The celebration has representatives in more than 60 countries. World Quantum Day is officially 14 April, but events take place on and around that date. Past activities have included explanatory video competitions for high school students, campaigns to translate “World Quantum Day” into many languages, museum talks that explore how quantum physics plays a role in people's day-to-day lives, and the creation of YouTube and other social media content.

Around the world, people at schools, museums, companies, and more are planning live and remote lectures, inviting students to intern in labs that do quantum-related research, hosting hackathons, and putting on events in which quantum science and art interact. If the UN-designated 2015 International Year of Light is anything to go by, expect upward of 13 000 events this year. Anyone can post an IYQ event or look up what's going on near them at <https://quantum2025.org/en/event-resource>.

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