Some opinions of physical socieites about the creation of a Commission on Quantum Technologies:

Physical Society in China, Taipei:

The proposed Commission should serve as an international nexus bridging fundamental quantum physics, engineering applications, and industrial integration. Its core role and scope should include:

1. International Coordination & Roadmap Harmonization: Providing an impartial, physics-grounded platform to monitor emerging quantum technologies (quantum computing, communication, sensing, and metrology) and identify critical fundamental physics challenges.

2. Global Standards & Benchmarking: Contributing to international benchmarking, terminology standardization, and verification metrics in close dialogue with standard bodies, national labs, and industry consortia.

3. Interdisciplinary & Cross-Commission Synergies: Acting as an interdisciplinary bridge linking related IUPAP commissions (such as C8 Semiconductors, C9 Magnetism, C10 Low Temperature Physics, and C17 Quantum Electronics) to avoid siloed research.

4. Global Talent Cultivation & Ethics: Promoting curriculum guidelines for multidisciplinary quantum education, ethical frameworks, and equitable access to quantum hardware and educational tools worldwide.

IoP, UK:

We support this. Quantum technology evolved from a set of specialised subfields into a broad and rapidly developing area spanning information, computing, communication, sensing, simulation and metrology. We would be happy to put forward candidates. We suggest aiming for a good balance across subfields, regions and career stages, so that the commission reflects the international nature of the field and does not draw mainly from the largest countries. We are not aware of any general restrictions that would prevent researchers in the UK or Ireland from serving on a body such as this.

Swedish Physical Society:

It could be interesting, but there is to my knowledge no initivative in Swedish. however, it could be coordinated with special efforts from the Swedish research council to boost and coordinate activities in quantum technologies.

Society of mathematicians, physicists and astronomers of Slovenia:

Our society supports the creation of Commission on Quantum Technologies. At the moment we do not have a candidate to nominate to this Commission.

Union of Physicists in Bulgaria

It's a very good idea to create such a new Commission.

Proposed IUPAP Commission on Quantum Technology

Strategic Plan

Professor Salah Obayya | Prepared for the IUPAP Council and General Assembly |

1. Purpose

A Commission on Quantum Technology will allow IUPAP to secure a recognized place in a rapidly developing field of science, closer connections with the international community in quantum science and technology, and increased recognition amongst academia, industry, and metrological institutions.

The quantum technology area has become one integrated field, yet there is no one place in IUPAP where the field of quantum technology can find its recognition. The International Year of Quantum Science and Technology in 2025 brought the field wide public and policy attention. The proposed Commission would turn this publicity into lasting results such as development of common standards, education, and international involvement in quantum science and technology.

This plan outlines the strategy of the Commission in achieving long-term outcomes in its first three-year term including its goals, five pillars on which its activities would be based, annual activities for each of the pillars, stakeholders, funding, and evaluation metrics.

2. Context

The field of quantum technology can no longer fit in a single branch of physics. There is also overlap with hard and soft aspects in computing, communication, sensing, simulation and metrology, and the carrots pulled on one now expect the others to do the same. Yet the ways in which physics is organized internationally are still classified by platform and discipline.

Existing IUPAP Commissions address the significant parts of this field, each one excellently from its platform's point of view. None addresses the whole field. This creates some practical problems:

- Two research teams using two separate qubit implementations may publish performance data in different formats, in the absence of a standardization organization.
- Different terminology and reporting practices. Same term can mean different things, and same quantity can be reported differently.
- Education and training resources belong to independent commissions, each community developing its own educational programs with limited interaction.
- Connections to metrology institutes and industrial sector are done on individual level, without any channel.
- There is no international organization for initiatives aimed at developing quantum construction capacity.

The IUPAP General Assembly set up the Working Group on Quantum Science and Technology (WG19) in 2021[1]. Its 2023 report indicated the consensus of the need for the establishment of the commission based on the maturity of the discipline, the multi-disciplinary nature of quantum physics, and the opportunity for equity and inclusiveness. This recommendation is based on this finding and on the recommendation of the young scientist's award by WG19.

Timing is appropriate for the following reasons. First, the maturity of the field would make common practices and standards possible and necessary. Secondly, there is now momentum from the International Year of Quantum which the commission can ride on. Thirdly, regions such as Africa are developing their quantum capacity, thus, including them early would influence the development of that capacity.

3. Vision, mission and strategic aims

Vision. A world where quantum technologies unite as one single science: results can be checked and verified by independent labs and into other biochemical platforms, whenever anyone across the world can contribute to the field and benefit from its growth and IUPAP is the first place the global community turns to for common practice and independent advice

Mission. To facilitate global collaboration in the area of quantum computing, communication, sensing and metrology; to foster the use of common terminology and create an environment that allows for more accurate comparison of results; to facilitate access to education and opportunities for participation through partnership with but not in place of other organizations.

The Commission has five aims:

- Coordinate international activity that falls between existing commissions.
- Promote common terminology and fair, reproducible ways of comparing results across laboratories.
- Support education and training, with priority for early-career researchers.
- Widen participation from under-resourced regions, including Africa.
- Strengthening links between university research, metrology institutes and industry.

4. The five strategic pillars

The Five Pillars transform the vision into action. All five share a common base of: collaboration with the commissions and allowing the foundation of the outputs and response to General Assembly.

#	Pillar	Objectives served	Core commitment
1	Coordination and convening	1 and 5	A single forum for computing, communication, sensing and metrology, with joint work run through contact people in C15, C17, C10 and C5.

#	Pillar	Objectives served	Core commitment
2	Common standards and practice	3	Terminology and reporting recommendations that allow fair comparison between laboratories, reviewed by C2 before release.
3	Education and early-career development	2 and 4	Summer schools, exchanges, a young scientist award and quantum content for training, developed with C13 and C14.
4	Global inclusion and equity	2 and 4	Priority for Africa and other under-resourced regions through travel support, regional events and virtual participation.
5	Partnerships and impact	1 and 5	Links with measurement institutes, standards organizations, industry and other scientific unions, with advice to the Council and General Assembly.

Above mentioned objectives: (1) Information and interplay sharing on computation, communication, sensing and metrology; (2) communication, camps, and exchanges; (3) common language and fair result comparison; (4) training, emerging researchers and participation of participants from neglected regions; (5) The collaboration with other commissions, measurement institutes, science unions, and reporting to each General Assembly.

5. Plan for each pillar

Pillar 1. Coordination and convening

The Commission would be the one place where the whole of quantum technology is discussed, while research tied to a particular platform stays with the commission that handles it now.

Serves	Objectives 1 and 5
Main actions	• Run cross-commission sessions, circulars and open reports. • Appoint one contact person in each partner commission (C15, C17, C10, C5) and invite them to Commission meetings. • Agree a short joint activity plan with each partner commission. • Meet at least once a year, with virtual participation, and publish minutes. • Refer scope disagreements first to the contact persons, then to the Chairs, then to the IUPAP Council.

Year 1	Constitute the Commission and appoint officers. Name contact persons. Agree scope with C15 and C17. Agree joint activity plans with each partner commission. Review scope at the end of the year.
Year 2	Hold the first joint sessions with partner commissions. Circulate the first report or circular.
Year 3	Report to the General Assembly. Review scope and membership. Propose a plan for next term.
Indicators	• Contact people active in all partner commissions. • Joint scope statements agreed. • Scope reviewed at the end of Year 1 and of the first term.

Pillar 2. Common standards and practice

Results from different laboratories and platforms are hard to compare when terms and reporting differ. The Commission would propose shared terms and reporting practice, starting small.

Serves	Objective 3
Main actions	• Propose common terms and reporting practices for quantum technologies. • Start with a short, well-justified set of terms and extend it from community feedback. • Submit every proposal to C2 for review before release. • Liaise with measurement institutes and standards organizations where relevant.
Year 1	Prepare a first draft of common terms. Set up the Terminology and Reporting Standards working group with C2.
Year 2	Circulate the terms for comment. Submit the consultation draft to C2.
Year 3	Revise the terms in light of comments and C2 review. Report progress to the General Assembly.
Indicators	Common terms drafted, reviewed by C2 and circulated for comment.

Pillar 3. Education and early-career development

Education and training efforts in quantum technology are scattered. The Commission would bring them together and put early-career researchers first.

Serves	Objectives 2 and 4

Main actions	• Organize a rotating program of summer schools, workshops and exchanges, planned jointly with partner commissions where topics overlap. • Design and, with IUPAP approval, launch a young scientist award, an idea proposed by WG19. • Develop quantum content and expertise for training with C13 and C14. • Provide travel grants for early-career and developing-country participants.
Year 1	Set up the Education and Early-Career Engagement working group with C13 and C14. Identify the first school or conference.
Year 2	Hold the first school or conference. Design the award criteria, eligibility and selection process for approval by IUPAP.
Year 3	Run the second event. Make the first award if IUPAP has approved the procedure. Publish quantum training content.
Indicators	• At least one school or conference is held. • Award procedure approved by IUPAP.

Pillar 4. Global inclusion and equity

Equity and inclusivity were among the reasons WG19 gave for a dedicated commission. They are part of how every activity is run and not a separate program.

Serves	Objectives 2 and 4
Main actions	• Reserve a share of schools, travel support and award eligibility for participants from under-resourced regions. • Hold or co-organize events in under-represented regions, including Africa, where feasible. • Offer hybrid and virtual participation as a standard option. • Work with C13 and national liaison committees to find and support emerging quantum communities. • Monitor participation by region, gender and career stage and report it to each General Assembly.
Year 1	Set up the Regional Participation and Outreach working group. Set targets for balanced representation among members. Start collecting participation data.
Year 2	Make sure the first school or conference includes documented participation from under-resourced regions. Open travel grants.

Year 3	Report on participation data to the General Assembly. Plan a regional event in Africa or another under-resourced region for next term where feasible.
Indicators	• Documented participation from under-resourced regions at the first event. • Participation reported by region, gender and career stage.

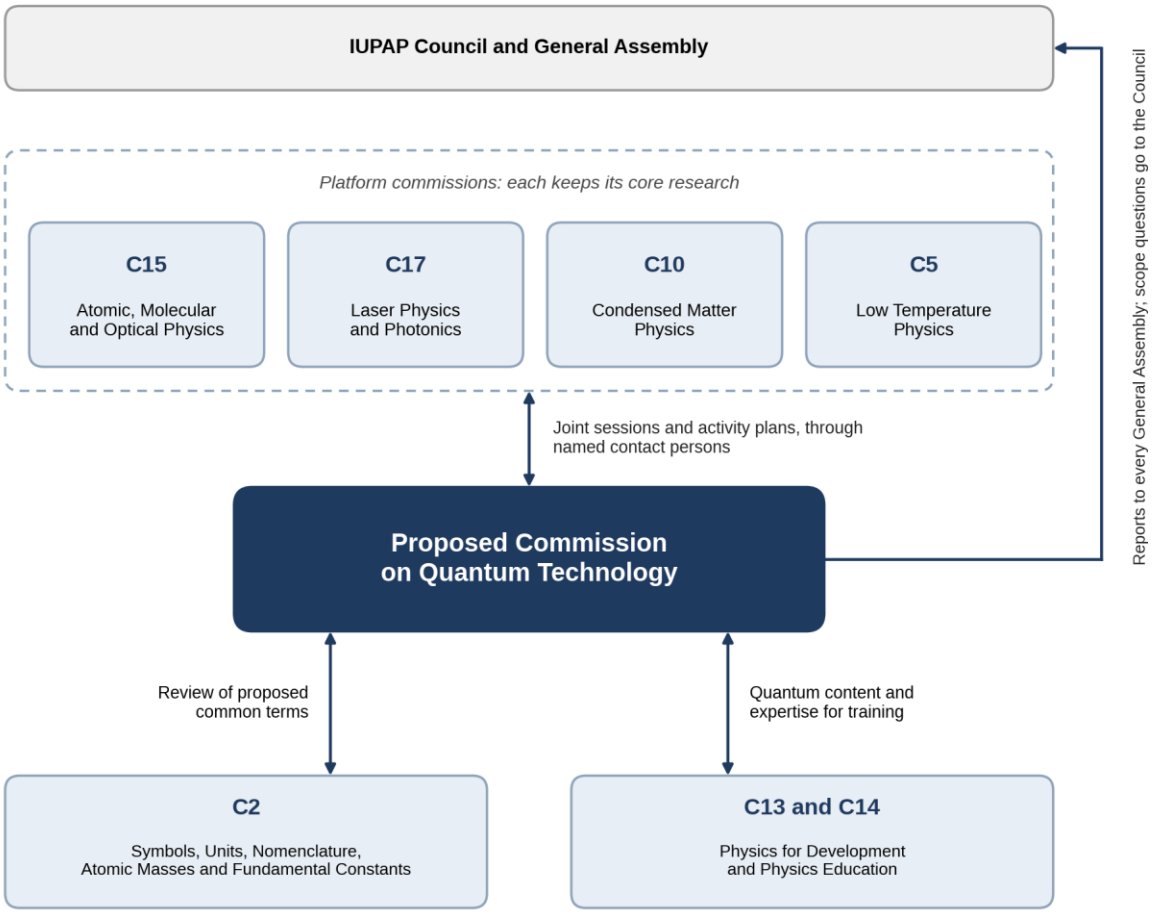
Pillar 5. Partnerships and impact

Links between university research, metrology institutes and industry are now handled case by case. The Commission would make them regular and would advise IUPAP on policy issues in the field.

Serves	Objectives 1 and 5
Main actions	• Work with measurement institutes, standards organizations, other scientific unions and the IUPAP Working Group on Quantum Science and Technology. • Invite associate members from measurement institutes and industry, without voting rights on matters reserved for full members. • Advise the Council and General Assembly on policy issues, including international coordination, access and equity. • Publish newsletters, circulars or handbooks from open and published material. • Seek co-funding from partner institutions, national societies and sponsors.
Year 1	Set up the Metrology and Industry Liaison working group. Invite first associate members. Identify partner institutions.
Year 2	Hold the first joint activity with a metrology institute or standards organization. Issue the first newsletter or circular. Secure co-funding for events.
Year 3	Give the General Assembly a summary of activity and of progress in the field. Review partnerships and associate membership.
Indicators	• Associate members from metrology and industry in place. • Summary of activity and field progress delivered to each General Assembly.

6. Foundation: working with existing commissions

The Commission would not take over work that other commissions already do. Each partner keeps its core area, and the two work together on the overlap.



Commission	Keeps	Joint work with the new Commission
C15 Atomic, Molecular and Optical Physics	Research on atoms, ions, molecules and light	Sessions on quantum computing, simulation and metrology with atomic systems
C17 Laser Physics and Photonics	Lasers, photonics and quantum optics	Photonic quantum communication and sensing
C10 Condensed Matter Physics	Materials and device physics, including quantum matter	Hardware for quantum computing and sensing
C5 Low Temperature Physics	Low-temperature physics, quantum fluids and solids	Cryogenic aspects of quantum devices

Commission	Keeps	Joint work with the new Commission
C2 Symbols, Units, Nomenclature, Atomic Masses and Fundamental Constants	Symbols, units and nomenclature	Review of proposed common terms
C13 Physics for Development and C14 Physics Education	Development and education programs	Quantum content and expertise for training

7. Governance and delivery

The Commission would follow the usual IUPAP structure of a Chair, Vice-Chair, Secretary and members. IUPAP would set its size and election process. The plan asks for balanced representation across sub-fields (computing, communication, sensing, metrology), regions and career stages, with a specific effort to include members from under-represented countries.

To keep the workload manageable, four small working groups are suggested for discussion. Each carry one or more pillars:

Working group	Pillar(s)	Partner commission(s)
Terminology and Reporting Standards	2	C2
Education and Early-Career Engagement	3	C13 and C14
Regional Participation and Outreach, including Africa	4	C13, national liaison committees
Metrology and Industry Liaison	5	Measurement institutes, standards organizations

Pillar 1 is carried by the officers and the contact persons. The Commission would meet at least once a year, with virtual participation, and would make minutes and activity summaries available to IUPAP and, where appropriate, to the wider community.

8. Three-year roadmap

Pillar	Year 1	Year 2	Year 3
1 Coordination and convening	Constitute the Commission. Name contact people. Agree scope and joint plans.	Joint sessions with partner commissions. First circular.	Report to General Assembly. Review scope and membership.
2 Common standards and practice	First draft of common terms.	Circulate for comment. Submit consultation draft to C2.	Revise terms after comments and C2 review.
3 Education and early-career development	Working group set up. First event identified.	First school or conference. Award designed.	Second event. First award if approved.
4 Global inclusion and equity	Targets set. Participation data collected.	Travel grants open. Under-resourced regions represented at first event.	Participation report. Plan regional events for next term.
5 Partnerships and impact	Working group set up. First associate members.	First joint activity with a metrology body. First newsletter. Co-funding secured.	Activity summary for the General Assembly. Review partnerships.

9. Resources

The Commission would need the usual IUPAP support for commission activities. All support would be requested, budgeted and reported under IUPAP's standard rules and rates for commissions, so this plan states no amounts. The main areas of support are:

- Commission meetings and member travel (Pillars 1 and 4)
- Summer school or conference support (Pillars 3 and 4)
- Early-career and developing-country travel grants (Pillars 3 and 4)
- Young Scientist Award (Pillar 3)
- Communications: newsletter, circulars and web (Pillars 1 and 5)

The Commission will report on its use of IUPAP support to each General Assembly.

The Commission expects to seek co-funding from partner institutions, national societies and sponsors for schools and events. It would also seek letters of support from IUPAP national liaison committees, national physical societies and relevant international organizations.

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10. Risks and Risk Management

Risk	Effect	Management
Overlap with existing commissions	Duplicated effort or friction between commissions	Joint organization, named contact people, and a scope review at the end of Year 1
Uneven participation across regions and career stages	Unbalanced representation and reduced legitimacy	Balanced representation targets, travel funding and virtual participation
High workload for a new commission	Slow delivery and volunteer fatigue	A few priorities in Year 1, more work added as capacity allows small working groups
Difficulty agreeing common terms	Delays or low uptake of recommendations	Open consultation, review by C2, and a phased start with a short list of terms
Limited funding for events and travel	Fewer opportunities for early-career and developing-country participants	Co-funding from partners, hybrid events and prioritized spending

11. Monitoring, reporting and review

The Commission would report to each General Assembly on activities, outcomes and progress in the field, and give the Council interim updates on request. At the end of the first term, IUPAP would review the Commission's scope, membership and impact against the indicators below and decide on renewal. The review would also ask whether the next work plan should change as the field develops.

Indicators of progress for the first term:

- Common terms drafted, reviewed by C2 and circulated for comments.
- At least one school or conference is held, with documented participation from under-resourced regions.
- Award procedure approved by IUPAP.
- Contact people active in all partner commissions.
- Participation data reported by region, gender and career stage.

Reference. [1] IUPAP WG19, Report of the Chair, 1 June 2023.

Professor Salah Obayya

Professor Salah Sabry Ahmed Obayya is Executive Vice President for Research at Zewail City of Science, Technology and Innovation, Egypt, and Honorary Professor of Photonics at the University of Nottingham, United Kingdom. He obtained a BEng, an MSc, and a PhD from Mansoura University and City University London, and he also holds a Doctor of Science from City University London, conferred in 2016, for international excellence in photonics – he is the first Arab or African scientist to have received the title.

During his initial years in academia, Professor Obayya was based in the UK and had appointments as Associate Professor at Brunel University London (2002-2006), Reader in Photonic Materials and Devices at the University of Leeds (2006-2008) and Chair of Photonics and Head of the Photonics and Broadband Communications Research Centre at the University of South Wales (2008-2013). During this time, he provided consulting services on photonic and optoelectronic device modelling to QuinetiQ, Filtronics and Fujitsu. He was appointed Honorary Professor of Photonics at the University of Nottingham in 2017, the first Arab or African scientist to do so.

In 2012, Prof. Obayya returned to Egypt to participate in the foundation of Zewail City of Science, Technology and Innovation, where he is the Founder and Director of the Center for Photonics and Smart Materials. He has since occupied various high-level management positions at Zewail City of Science, Technology and Innovation: Vice Chairman of Zewail City, President of Zewail City's University of Science, Technology and Innovation (2015–2017), Director-General of Research Institutes (2023–2025), and from October 2025 to date, Vice Executive President for Research.

His research is focused on computational photonics and electromagnetics, with work on photonic crystals, plasmonics, and metamaterials for energy-efficient devices, and recent work on quantum photonics, quantum key distribution, inverse design driven by AI, and Physics-Guided Neural Networks. His applications include renewable energy using solar cells and photonic techniques, biosensing for cancer and DNA diagnosis, and optical sensing for environmental monitoring.

The scale of his research influence is reflected in his extensive track record in research output, funding, and graduate student supervision: 353 journal papers and more than 285 conference papers cited more than 9000 times; career research grants totaling approximately USD 4.4 million; and supervision of around 150 graduate researchers—78 MSc, 55 PhD, and 14 postdoctoral fellows. He acts as Editor-in-Chief of Optical and Quantum Electronics and Senior Editor of the IEEE Photonics Journal, and currently holds a UNESCO Chair for innovative

technologies for sustainable development in Africa, via which he runs training programs for African graduate students.

His accomplishments have gained much international acclaim. He is a Fellow of the Institute of Electrical and Electronics Engineers (IEEE), a Fellow of the World Academy of Sciences (TWAS), a Fellow of OPTICA, and a Fellow of the African Academy of Sciences (AAS). He is also a member of the International Society for Optics and Photonics (SPIE), American Physical Society, Institute of Physics, and many other prominent scientific societies. His awards include the Nile Prize in Science, African Union Kwame Nkrumah Continental Award for Scientific Excellence, Khalifa Award for Distinguished Professor in Scientific Research, and Abdul Hameed Shoman Award for Arab Scientists in Engineering Sciences.

The career of Professor Obayya exemplifies how quantum photonics, artificial intelligence, and computational intelligence can be turned into tangible solutions for sustainable energy, health care, environmental protection, and secure digital transformation. His scientific excellence, his institutional leadership, his international acclaim, and his dedication to educating future scientists qualify him as a worthy recipient of this award.