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Symposium on Teaching and Learning Quantum Physics

Wednesday, December 15, 2021 9:00 AM (1h 30m)

Quantum physics and its implications for future science and technology is becoming culturally important and more attention is being given to its introduction before university level.

There is a rich literature about different approaches and strategies [2]: 1) historico-philosophical, 2) matter-wave, 3) two-state systems, 4) Feynman path integrals, 5) quantum field theory, 6) quantum technology, which have been all adapted for pre-university level. Further differences are in: a) contextual aspects: e. g. choosing a spin, polarization or double well two-state system, and b) methodological aspects, using frontal traditional presentation or active engagement methods. All approaches show learning gains among students.

Given the diversity of approaches, there are growing efforts [3] to identify key concepts to be taught and key competences to be learned hinting that all approaches might not be equally suitable to introduce different concepts. The symposium gathers experts who have experience in teaching quantum physics with some of these approaches in different settings and with different populations to share their experience and insights into the advantages and potential limitations of the various presented approaches.

1. **Stefan Hausler** (Institute of Physics Education, University of Münster, Wilhelm-Klemm-Straße 9, 8149 Münster, Germany)
2. **Kim Krijtenburg-Lewerissa** (Freudenthal Institute for Science and Mathematics Education, University of Utrecht, Princetonplein 5, 3584 CC Utrecht, The Netherlands)
3. **Paul Emigh** (Department of Physics, Oregon State University, 301 Weniger Hall Corvallis, OR 97331-6507, United States of America)
4. **Maria Bondani** (Institute for Photonics and Nanotechnologies, Italian National Research Council, via Vialleggio 11, 22100 Como, Italy)

Discussant

Gesche Pospiech

Faculty of Physics, Technical University Dresden, 01069 Dresden, Germany

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References

- [1] G. Pospiech, M. Michelini, A. Stefanel, L. Santi, Central features of quantum theory in physics education, in *Frontiers of Physics Education*, R. J.-Sepic et al eds., Zlatni, Rijeka, pp.85-87 (2008).
- [2] M. Michelini et al, *J. Phys.: Conf. Ser.* 1929 012044 (2021)
- [3] See pilot projects at <https://qt.eu/about-quantum-flagship/projects/education-coordination-support-actions/>

Primary author: MICHELINI, Marisa (Department of Physics, University of Udine (Italy))**Co-author:** FALETIC, Sergej**Presenter:** MICHELINI, Marisa (Department of Physics, University of Udine (Italy))**Session Classification:** Plenary 6 - Hanoi/Wroclaw**Track Classification:** 20. Contemporary physics and modern physics in schools and universities