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Measuring the Elusive: Quantum Physics Rewrites the Metric System (Public Lecture @ Teatro Miela)

Thursday, 29 May 2025 18:30 (1:00)

Content

Quantum science has revolutionised modern electronics and global telecommunications, with inventions like the transistor, lasers, rare-earth magnets and light-emitting diodes all made possible by quantum mechanics. Quantum science has also redefined how we measure everything from time to length to speed; it was the basis for a fundamental revision in 2019 for all measurements, introducing a highly stable system of standards, such as those defining the weight of a kilogram, based on invariable constants of nature. How and why this reformed measuring system came about is a fascinating tale of history and technology coming together to produce ever-precise measurements, and is the topic of a public event co-sponsored by ICTP and SISSA titled "Measuring the Elusive: Quantum Physics Rewrites the Metric System".

In an entertaining, one-hour performance involving the use of lasers, pendulums and voltmeters, Nobel Laureate William Phillips, appearing online, and Professor Vanderlei Bagnato of Sao Paulo University will highlight, through hands-on demonstrations, how quantum physics has changed our standard system of units.

Phillips, who received the Physics Nobel Prize in 1997 for developing laser cooling and trapping of atoms, will connect from the American National Institute of Science and Technology in Washington DC for a live conversation with Bagnato and the audience, while Bagnato—on stage—will perform real-time experiments that will help us grasp the meaning of the transformations undergone by our measurement system.

Summary

Presenter(s): VANDERLEI SALVADOR BAGNATO (UNIVERSITY OF SÃO PAULO, BRAZIL), WILLIAM PHILLIPS (UNIVERSITY OF MARYLAND, USA - ONLINE)

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