



THE FIRST HUNDRED QUANTUM YEARS. WHAT NEXT?

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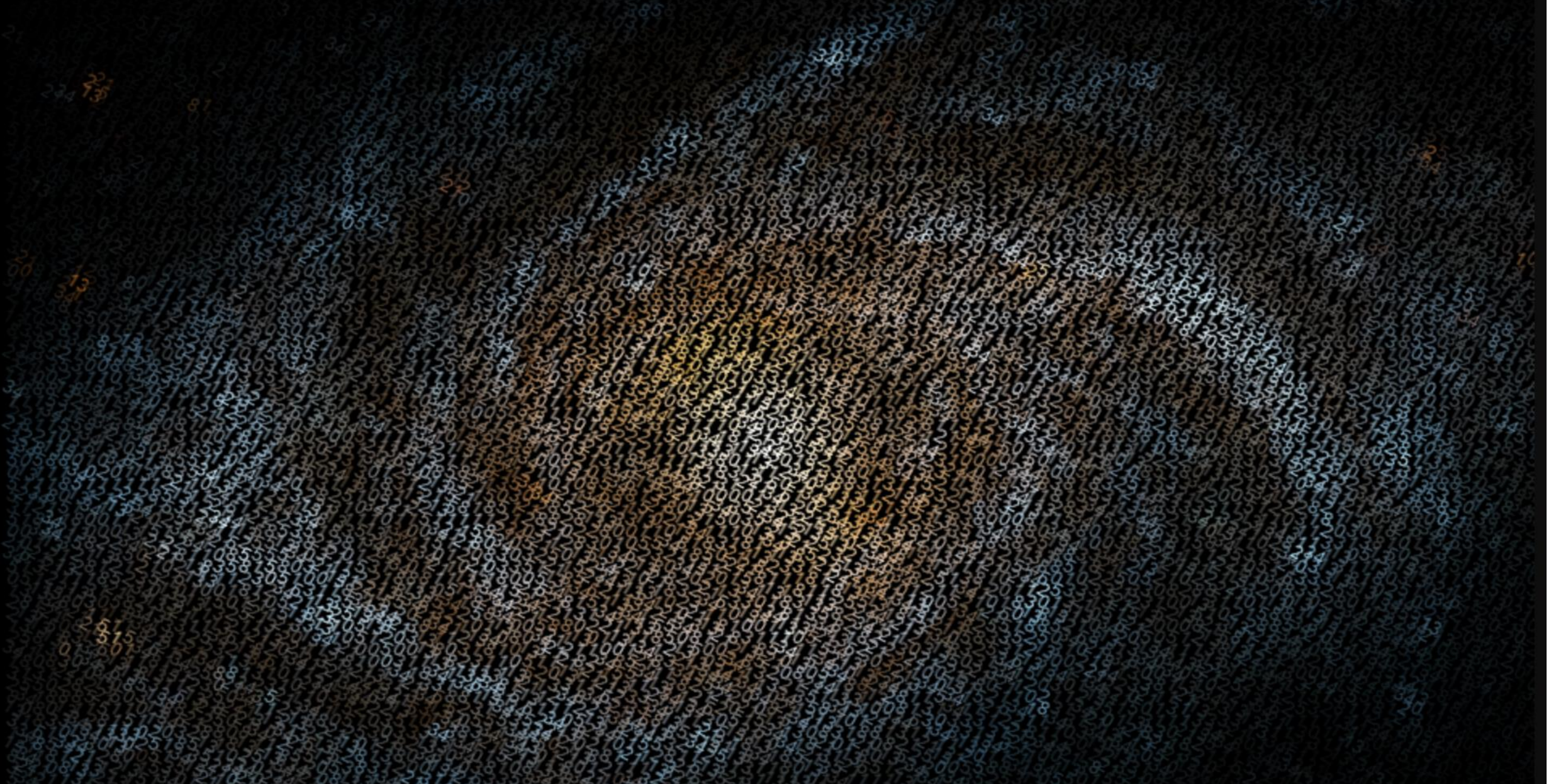


EVENTS <https://quantum2025.org/events/>



ASEAN QUANTUM SUMMIT 2025





**MUSEUM OF QUANTUM REALITIES: QUANTUM+ART COURSE
CULMINATING EVENT**

THE QUANTUM CIRCLE



**AFRICA LEADS.
THE WORLD WATCHES.**

DECEMBER 12

WOMEN IN THE HISTORY OF QUANTUM PHYSICS

BEYOND KNABENPHYSIK

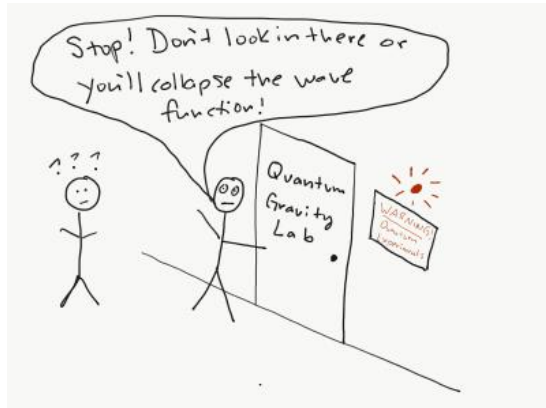
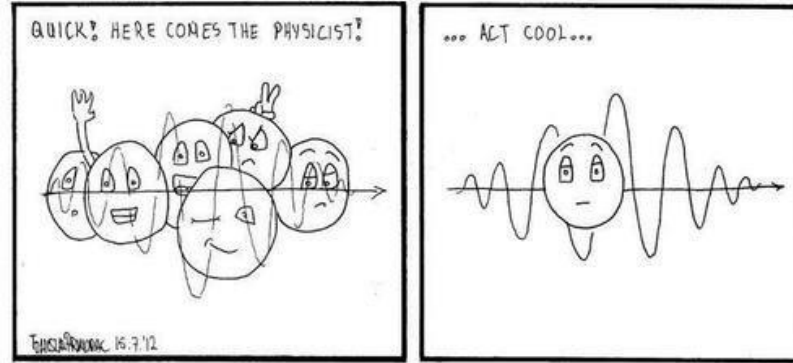


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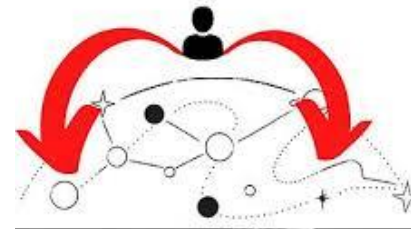




QUANTUM MECHANICS PARTICLE PRACTICAL JOKE



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Quantum physics



Physicists disagree wildly on what quantum mechanics says about reality, *Nature* survey shows

First major attempt to chart researchers' views finds interpretations in conflict.

EDITORIAL | 30 July 2025

Physicists should revel in the diversity of ways to understand quantum mechanics

***Nature* survey shows that disagreement about the meaning of quantum physics remains strong, even 100 years in. And that's OK.**

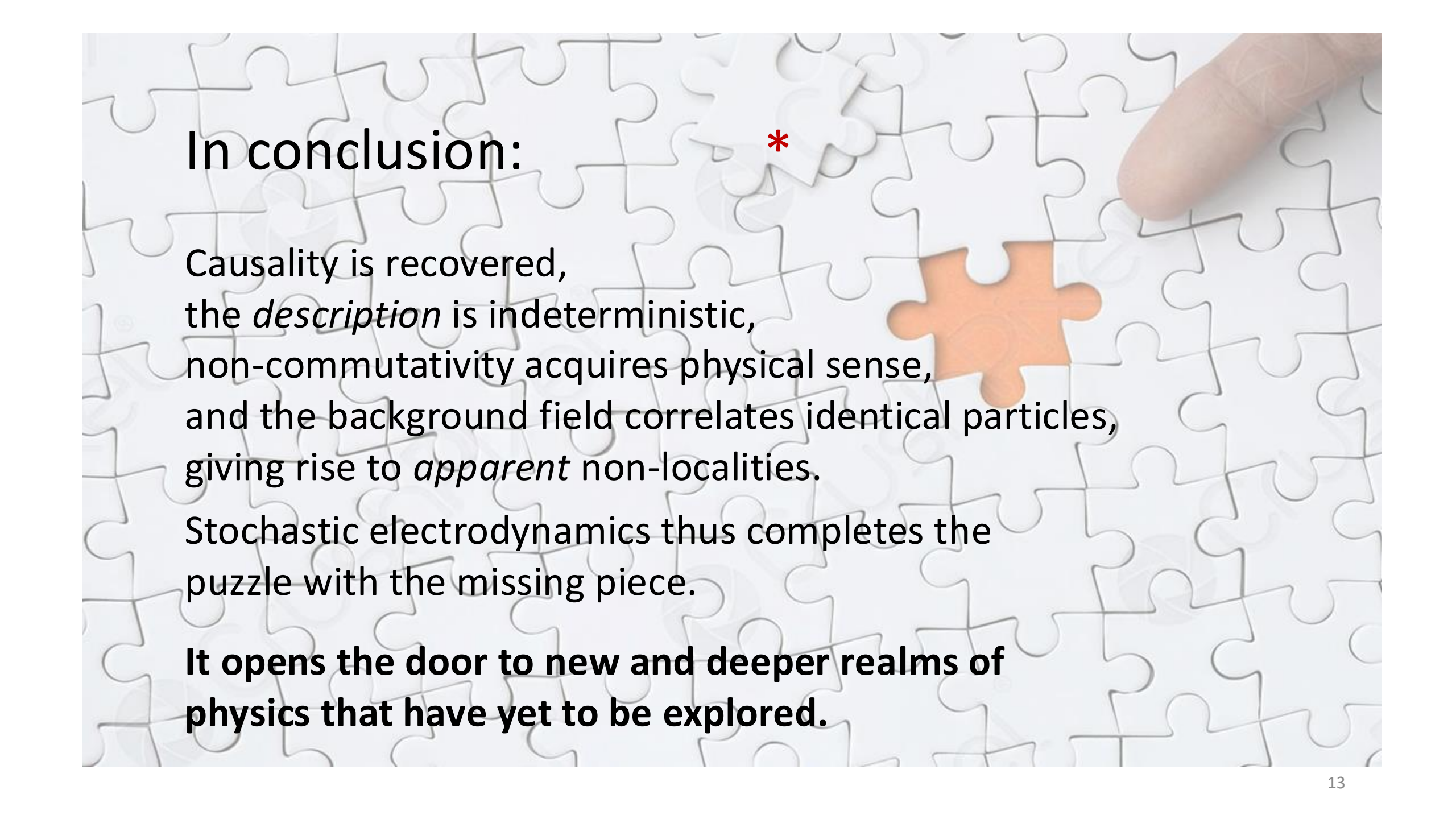
Quantum mechanics: An (almost) complete theory

- What is the physical mechanism behind the matrix formalism?
- What is the origin of the quantum fluctuations?
- What is it that endows quantum particles with wavelike properties?
- What is it that makes quantum mechanics so “weird”?

Completing the quantum ontology. Reinstating the radiation field

- M. Planck, 1912: Über die Begründung des Gesetzes der schwarzen Strahlung, Ann. d. Phys. 37, 642. $\implies \mathcal{E} = (1/2)\hbar\omega$.
- W. Nernst, 1916: Über einen Versuch, von quantentheor. Betrachtungen zur Annahme stetiger Energieänderungen zurückzukehren. Verh. Deutsch. Phys. Ges. 18, 83.
- T. W. Marshall, 1963: Random electrodynamics, Proc. Roy. Soc. A 276, 475.

$$(\tau = 2e^2/3mc^3) \implies m\ddot{\mathbf{x}} - \mathbf{f}(\mathbf{x}) - m\tau\ddot{\ddot{\mathbf{x}}} = e\mathbf{E}(t).$$



In conclusion:

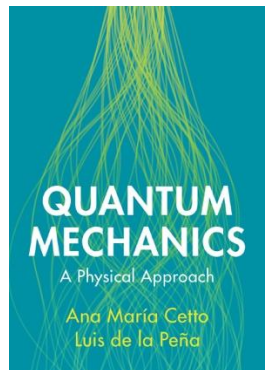
Causality is recovered,
the *description* is indeterministic,
non-commutativity acquires physical sense,
and the background field correlates identical particles,
giving rise to *apparent* non-localities.

Stochastic electrodynamics thus completes the
puzzle with the missing piece.

**It opens the door to new and deeper realms of
physics that have yet to be explored.**

Some useful references:

- T. W. Marshall: *Random electrodynamics*, Proc. Roy. Soc. A 276, 475, 1963.
- L. de la Peña, A. M. Cetto: *The Quantum Dice. An Introduction to Stochastic Electrodynamics*. Kluwer, 1996.
- L. de la Peña, A. M. Cetto and A. Valdés-Hernández: *The Emerging Quantum. The Physics Behind Quantum Mechanics*. Springer, 2015.
- A. M. Cetto and L. de la Peña: *The Radiation Field, at the Origin of the Quantum Canonical Operators*. Found. Phys. 54:51, 2024.
- A. M. Cetto and L. de la Peña: *Quantum Mechanics – A Physical Approach*. Textbook. Cambridge University Press, 2025, 640 pp. ISBN: 9781009679626





**THANK YOU
FOR YOUR ATTENTION**