WITH DEEPEST GRATITUDE

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Thanks to Ryan Postel for helping with today's production needs.

Find a complete list of quotes, sources, and visuals from the performance here:

https://amynam.com/schrodingers-box

Fermilab
Office of Education and Public Engagement

12:30pm, Friday, May 29th
Ramsey Auditorium, Wilson Hall
Batavia, IL

please join us for a reception
in the Art Gallery
2:30-3:30pm

THE HARP INSIDE SCHRÖDINGER'S BOX

I. Casting Nets

What is our physical world made of? If you keep dividing something smaller and smaller, where does it stop—or does it? Poets, philosophers, and scientists have speculated on this question from ancient times to the modern day.

Explore modern knowledge of particle physics at fnal.gov:

II. Ultraviolet Catastrophe

In the late 19th century, physicists faced a problem: experimental results contradicted the best theory about the relationship between light's wavelength and its intensity. What could explain this? Eventually, the answer was provided by Max Planck's revolutionary hypothesis that energy only comes in discrete quantities.
Animations by Doğa Kürkçüoğlu

III. Quantum of Action

In 1900 Planck introduced a tiny number—what became known as Planck's constant—that defines all that goes on in the subatomic world.

IV. Quantum of Light

Five years later, Albert Einstein took Planck's idea further, proposing that light itself comes in discrete packages, or quanta—what would later become known as photons—revealing that light doesn't just act as a wave, but as a particle, too.

V. La mécanique ondulatoire

In 1924, Louis de Broglie extended Einstein's ideas about the dual nature of light to matter, showing that matter too exhibits dual particle and wave properties.

VI. Discontinuities

A year later, Werner Heisenberg published a paper that gave rise to his famous "uncertainty principle." When you measure the position of a quantum particle such as an electron, the particles (photons) you are using to make the measurement interact with the electron, abruptly changing its momentum. Thus, you can never know both a particle's position and momentum simultaneously.

VII. Ψ

In 1926, Erwin Schrödinger published his famous equation using the Greek letter Ψ ("psi") as a variable allowing the probability amplitude of a particle's properties, including momentum, energy, and position, to be calculated.
Animations by Doğa Kürkçüoğlu

VIII. Wavicle

Electrons: are they waves or particles? ...Not exactly, says the great American physicist Richard Feynman.

IX. Broken Symmetry

Inspired by the eponymous 21-ton steel sculpture on Fermilab's campus that was conceptualized by Dr. Robert Rathbun Wilson (director of Fermilab from 1967 to 1978), this movement meditates on the symmetries and broken symmetries inherent in the fundamental constituents of matter that give rise to our world as we know it.

Explore the history of the sculpture at fnal.gov:

X. Entangled

In 1935 Schrödinger introduced the term "entanglement" to describe the mysterious way quantum states become entwined. When two particles are entangled and you measure the state of one, your measurement instantaneously also changes the state of the entangled partner, no matter how far away it is.

XI. Fragile Creatures

Far beneath the microscopic level, quantum states can be disrupted by a stray radio signal or single cosmic ray.
Title from Doğa Kürkçüoğlu

XII. Nature's Imagination

What remains to be discovered? What motivates the work of scientists today?

Explore further with Dr. Don Lincoln: