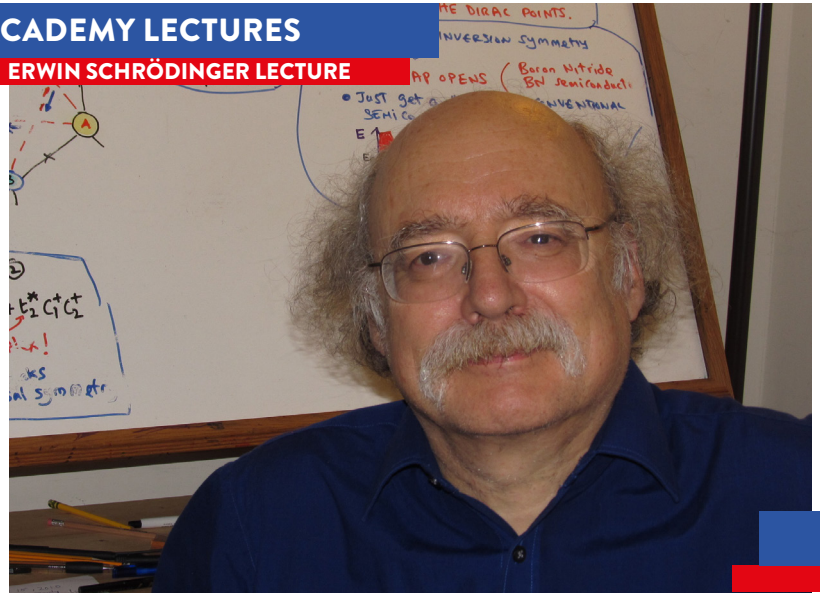
WWW.OEAW.AC.AT

ÖAW AUSTRIAN ACADEMY OF SCIENCES

JUNE 27, 2023
6:00 PM
AUSTRIAN ACADEMY OF SCIENCES
FESTIVE HALL
DR. IGNAZ SEIPEL-PLATZ 2
1010 VIENNA

ACADEMY LECTURES

ERWIN SCHRÖDINGER LECTURE



© Privat

QUANTUM ENTANGLEMENT IN NOVEL "TOPOLOGICAL" STATES OF MATTER, AND THE "SECOND QUANTUM REVOLUTION"

DUNCAN HALDANE
Princeton University

WELCOME

ULRIKE DIEBOLD
Vice-President of the Austrian Academy of Sciences

For many years after Einstein pointed out that quantum mechanics predicted a strange "entanglement" property, which Schrödinger explored in more detail, it was a philosophical problem, but today it has become a practical and technological problem, leading to what some see as the current "second quantum revolution". In condensed matter systems (electrons or cold atoms), it plays a key role in novel quantum states with "fractionalized" excitations ("anyons") that many believe could provide "topologically protected" platforms for quantum computing, which could store quantum information non-locally in entanglement patterns that protect it from destructive interactions with the environment while it is being processed. A remarkable example is that of "Majorana zero modes", which represent one half of an electron orbital, spatially separated from its other half, with which it is entangled!

F. Duncan M. Haldane is co-recipient of the 2016 Nobel Prize for Physics alongside David Thouless and Michael Kosterlitz for his work on one-dimensional systems of magnetic atoms (for which he had previously received the 1993 Oliver Buckley Prize of the American Physical Society), and on the theoretical prediction of (ferromagnetic) topological insulators (for which he had shared the 2012 Dirac medal of the International Center for Theoretical Physics with Charles Kane and Shou-Cheng Zhang). He is currently the Sherman Fairchild University Professor of Physics at Princeton University, as well as Fellow of the Royal Society of London, the U.S. National Academy of Sciences, the American Academy of Arts and Sciences, the American Association for the Advancement of Science, the American Physical Society, and the Institute of Physics (UK).
Haldane's work helped to open up new directions and ways of thinking about quantum effects in condensed matter, and in recent years, "topological quantum matter" has grown into a very active experimental field which many believe may provide platforms for "quantum computing".

Named after the Austrian physicist and Nobel laureate, the "Schrödinger Lectures" are a series of events which cover all aspects of physics. They belong to the broader category of the "Academy Lectures", which bring prominent speakers from various fields to the Austrian Academy of Sciences in Vienna to address current scientific and societal issues.

Please register at: *www.oeaw.ac.at/anmeldung/akademievorlesungen*

CONTACT: Georg Bërveniku-Brunner, Austrian Academy of Sciences,
T: +43 1 51581-1217, *georg.brunner@oeaw.ac.at*