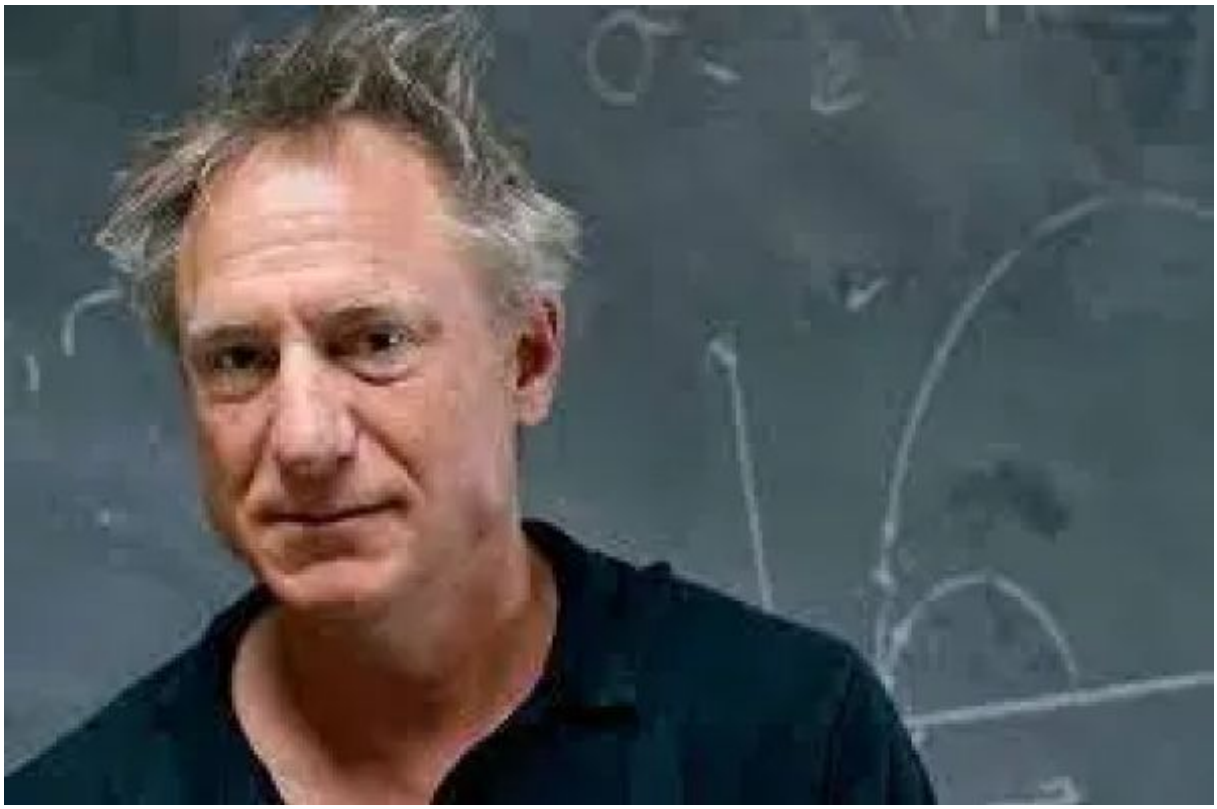

ICFO Colloquium Series: Quantum Many-body theory in the Quantum Information era

MATTHEW FISHER

May 03, 2024
12:00 to 13:00
ICFO Auditorium

BIO:

Matthew Fisher received his Ph.D. in theoretical physics from the University of Illinois at Urbana-Champaign in 1986, and went on to become first a Visiting Scientist and then a Research Staff Member at IBM T. J. Watson Research Center (1986-1993). Matthew joined the Kavli Institute for Theoretical Physics and the Physics Department of the University of California in 1993. In 2007 he joined Microsoft's Station Q as a research physicist, on leav from the UCSB physics department. During the academic year 2009-2010 Matthew was o the faculty at Caltech, returning to the physics department at UCSB in summer 2010. Fishe received the Alan T. Waterman Award bestowed by the National Science Foundation in 1995 the National Academy of Sciences Award for Initiatives in Research in 1997, and the Oliver E

Buckley Prize in Condensed Matter Physics in 2015. He was elected as a Member of th American Academy of Arts and Sciences in 2003 and to the National Academy of Sciences i 2012.

ABSTRACT:?

Traditionally, quantum many-body theory has focussed on ground states and equilibriu prop-erties of spatially extended systems, such as electrons and spins in crystalline solids. I recent years \noisy intermediate scale quantum computers" (NISQ) have emerged, providin new oppor-tunities for controllable non-equilibrium many-body systems. In such dynamica quantum systems the inexorable growth of non-local quantum entanglement is expected, bu monitoring (by making projective measurements) can compete against entanglemen growth. In this talk I will overview theoretical work exploring the behavior of \monitored quantum circuits, which can exhibit a novel quantum dynamical phase transition between weak measurement phase and a quantum Zeno phase, the former which we characterize i detail. Accessing such physics in the lab is chal-lenged by the need for post-selection, whic might be circumnavigated by decoding using active error correction.

Hosted by Prof. Dr. Maciej Lewenstein

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