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Joint PQSEI-Particle Physics Colloquium

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Intersections of Particle Physics and QIS at Fermilab

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10:00 – 11:00 a.m.
LWSN 1142

Joseph Lykken is Fermilab's Deputy Director of Research and leads the Fermilab Quantum Institute. A distinguished scientist at the laboratory, Lykken was a former member of the Theory Department, researching string theory and phenomenology, and is a member of the CMS experiment on the Large Hadron Collider at CERN. He received his Ph.D. from the Massachusetts Institute of Technology and has previously worked for the Santa Cruz Institute for Particle Physics and the University of Chicago. Lykken began his tenure at Fermilab in 1989. He is a former member of the High Energy Physics Advisory Panel, which advises both the Department of Energy and the National Science Foundation, and served on the Particle Physics Project Prioritization Panel, developing a road map for the next 20 years of U.S. particle physics. Lykken is a fellow of the American Physical Society and of the American Association for the Advancement of Science.

The intersections between high energy particle physics (HEP) and QIS originate with Richard Feynman's original suggestion to use quantum computers to solve quantum problems. HEP physicists have become alpha users of NISQ processors, starting to build a pathway to simulating the real time dynamics of LHC collisions and the dynamics of quantum gravity. In the near term, newly-emerging quantum sensor technologies are being applied to the challenge of detecting ultralight dark matter in the laboratory, including new experiments launching at Fermilab. At the same time technologies and infrastructure developed for HEP are finding quantum applications; these include ultra-high Q superconducting RF cavities, cryogenic electronics, and fast DAQ for high rate quantum communications.

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