PURDUE UNIVERSITY

Purdue Quantum Science and Engineering Seminar

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After receiving his Ph.D. in Theoretical Physics at the Swiss Federal Institute of Technology, Gerardo Ortiz continued his career in the US, first, as a postdoctoral fellow at the University of Illinois at Urbana-Champaign, and then as an Oppenheimer fellow at the Los Alamos National Laboratory where he stayed as a permanent staff member until 2006. He is currently working in the Department of Physics at Indiana University, Bloomington. His scientific career has spanned a large variety of topics in condensed matter physics and quantum information science, including electron fluids and solids, topological quantum matter, high-temperature superconductivity, quantum critical phenomena, cold atom physics, and entangled-quantum probes of matter, among others.

Physics and Computation (with Nuclear Spins)

Monday, February 17, 2020
3:30 – 4:30 p.m.
BRK 1001

There is a deep connection between Physics and Computation. Indeed, any computation can be represented as a physical process. In 1981 Richard Feynman raised some provocative questions in connection to the simulation of physical phenomena using a special device called a "Quantum Computer". Such a device was intended to mimic physical processes exactly the same as Nature, and thus shared those "spooky" features of quantum physics. Remarks coming from such an influential figure generated widespread interest in these ideas, and today, more than three decades after, there are still open questions. What kind of physical phenomena can be efficiently mimicked?, How?, and What are its limitations? I will address these questions in the broader context of what is currently known as quantum information science. I will show quantum simulations in a liquid NMR quantum computer of Fano-Anderson resonant impurity scattering and Aharonov-Bohm effect with anyons.