GREEN FAMILY LECTURE SERIES

ipam institute for pure & applied mathematics

GREEN FAMILY LECTURE SERIES BY DR. MARGARET MURNANE

Margaret Murnane
University of Colorado

Margaret Murnane, Distinguished Professor of Physics at the University of Colorado, is a Fellow of JILA and runs a joint, multi-disciplinary, research group with her husband, Prof. Henry Kapteyn. She received her B.S and M.S. degrees from University College Cork, Ireland, and her Ph.D. degree from UC Berkeley. Margaret, with her group and collaborators, uses coherent beams of laser, EUV and soft x-ray light to capture and manipulate the structure and interactions in materials at the nanoscale. She is a Fellow of the American Physical Society, and the AAAS, and a member of the National Academy of Sciences and the American Philosophical Society. Margaret is the Director of the National Science Foundation STROBE Center, where scientists from 6 universities are building the microscopes of tomorrow.

Building the Microscopes of Tomorrow

Monday, October 10, 2022 @ 5:00PM
Neuroscience Research Building (NRB) Auditorium, UCLA

If we could see in detail how the most advanced computer chips and solar panels work, or how viruses penetrate cells in real time, we would be able to develop more energy-efficient nanotechnologies, as well as better antimicrobials and vaccines. The microscopes of tomorrow, that take advantage of light or electrons to illuminate an object, can enable stunning views of how the nano world works in real time.

Poster Session and Reception to follow at IPAM.

This lecture will be accessible to a general public audience.

Harnessing Quantum Physics for Tabletop X-Ray Lasers

Tuesday, October 11, 2022 @ 5:00PM
Neuroscience Research Building (NRB) Auditorium, UCLA

Ever since the invention of the laser over 60 years ago, scientists have been striving to create an X-ray version of the laser. The X-ray sources that are in widespread use in medicine, security screening, and technology are in essence a more powerful version of the X-ray light-bulb source that Röntgen built in 1895. In the same way that visible lasers can concentrate light energy far better than a light bulb, a directed beam of X-rays could drive revolutionary advances in science and technology. However, until recently, the power levels required to make an x-ray laser prohibited their widespread use. Fortunately, the challenge of creating tabletop x-ray lasers was solved in a surprising way – by the beauty and power of quantum physics. Visible ultrafast lasers can essentially make electrons sing, to create rainbows of x-ray light – from the ultraviolet to soft X-ray wavelengths.

This lecture is intended for a scientific audience.

(Image by Joshua Knobloch and Steven Burrows, JILA)

NSF UCLA

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