

Discovering Novel Quantum Phenomena



Nina Markovic
Associate Professor, Physics and Astronomy

CURRENT RESEARCH


Sophisticated fabrication methods lead to cutting-edge devices

When broken down into small pieces, some of the most important technologies we use everyday rely on fundamental elements of physics. From our cell phones to the tools astronomers use to study the planets, understanding the movement of particles down to the level of the electron is of vital importance. In some cases, the behavior of electrons can be manipulated in useful ways. For instance, low dimensional electron systems, in which one or more spatial dimensions are small enough to restrict the quantum mechanical wavefunction of electrons contained inside, are inherently dominated by quantum effects and correlations between electrons, leading to a host of unusual properties, fascinating new states of matter, and unique application possibilities. Dr. Nina Markovic, Associate Professor of Physics and Astronomy at Johns Hopkins University, investigates quantum transport in low dimensional systems. In particular, she and her team aim to design quantum matter in nanostructures by controlling the size, shape, and boundary conditions. The focus of her recent work is superconducting nanowires, which represent a model quantum system that can provide general insight in quantum phenomena. Additionally, they are the basic elements of quantum devices, such as photon detectors and superconducting quantum computers. Her research is on the cutting-edge of discovery and control of novel quantum phenomena.

While of significant importance to fundamental understanding, which drives the development of technology, Dr. Markovic's research will also have a direct impact on technologies that are already in progress. For example, photon detectors can be used by astronomers to image the universe while superconducting quantum computers...

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AFFILIATION

 Johns Hopkins University

EDUCATION

- Ph.D., in Physics, 1998 , University of Minnesota
- B.S., in Physics, 1993 , University of Zagreb, Croatia

RESEARCH AREAS

Technology, Materials Science / Physics, Nanotechnology, Space

FUNDING REQUEST

Your contributions will support the continued research of Dr. Nina Markovic, of Johns Hopkins University, as she develops novel 3D techniques for the fabrication of nanostructures. Donations will fund the necessary \$200-300K/year required for equipment costs, nanofabrication costs, personnel, and other operating cost or supplies. Join in elucidating fundamental questions of physics and conceiving novel device applications by funding Dr. Markovic's research.

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