

**UNIVERSITY OF TEXAS AT DALLAS - DEPARTMENT OF PHYSICS**  
**PHYSICS COLLOQUIUM**

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Wednesday, March 30, 2005; 4:00-5:00 PM  
in Kusch Auditorium, FN 2.102

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**Seven Wonders of Quantum Nanoelectronics**

**Dr. Igor Altfeder**

*NanoTech Institute, University of Texas at Dallas*

Over the last several years experimental studies of quantum materials have increasingly revealed broken-symmetry ground states indicating unusual charge and spin order. According to the concept of “confinement”, suggested by P.W. Anderson, in a condensed matter there exists an analogue of a strong force playing a crucial symmetry-breaking role in quantum nanoelectronics. This talk will bring together experimental work covering a variety of systems, from nanostructures to molecular crystals, allowing the audience to appreciate the common trend. The illustrations will include: quantum mirages and remote electronic sensing, formation of symmetry-breaking stripes, and selective visualization of strongly-correlated and quantized states. The discussion will provide some context for interpreting the experimental images from Scanning Tunneling Microscopy, and understanding the appearance of “magic numbers” during self-assembled growth of nanostructures.

**About the speaker:** Igor Altfeder received PhD in physics from Kapitza Institute for Physical Problems of Russian Academy of Sciences. He has a 20-year experience of working on Scanning Tunneling Microscopy of low-dimensional materials. Upon arrival to United States in 1995 he joined a nanoscience research team at the Rowland Institute and later at Harvard University, where he obtained the first experimental confirmation of anisotropic Anderson-Kondo “confinement” in nanostructures. He currently works as Research Scientist in UTD. His specialization is nanoelectronics, materials and surface science.