Santos Research Group Room 504, Email lsantos2@yu.edu   I enjoy having students involved in my research projects. The plots you see on this page were the result of the work developed by two Stern College students (Frieda Dukesz and Marina

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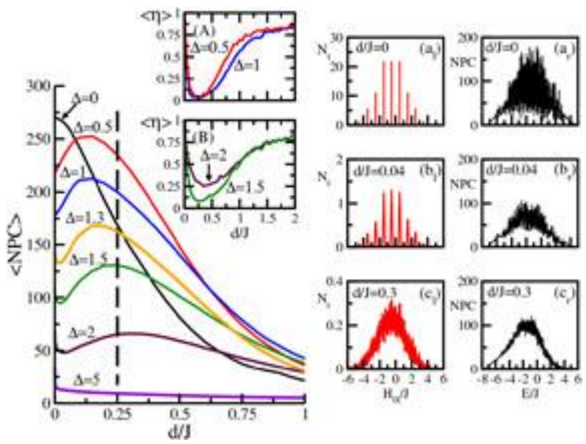

I enjoy having students involved in my research projects. The plots you see on this page were the result of the work developed by two Stern College students (Frieda Dukesz and Marina Zilbergerts) over the summer of 2008. It led to the publication of a paper in a scientific journal. This work was orally presented by Frieda in the largest international conference of physics, called March Meeting, which in 2009 happened in Pittsburgh, PA. Another good example is the work we have been developing with Julie Dinerman for her honor thesis. We are now finishing a paper, which she will orally present in the March Meeting of 2010, which this time will happen in Portland, OR.

Students interested in doing research in my group over the summer or during the semester should come to my office to chat about the possibilities. I am a theoretical physicist, so my “lab” consists of computers where we run simulations. The way students get involved is the following:

1) First you read articles and books about quantum mechanics and topics of my research. You present some of these topics in an informal atmosphere and we discuss them.

2) You also learn how to program. We start with a friendly software known as Mathematica, and later on we move to Fortran, a more sophisticated programming language.

3) After acquiring this initial background, we then start reproducing results from scientific papers and eventually get our own new results. If they are interesting enough, we may write a manuscript and send to a scientific journal.

Some of the areas of my research include:

1. Metal-insulator transition

2. Interplay between interaction and disorder in quantum systems
3. Onset of quantum chaos in one-dimensional systems
4. Relation between quantum chaos and thermalization in isolated quantum systems
5. Relaxation of open quantum systems and transport of energy
6. Development of quantum control methods to manipulate the transport behavior of many-body systems
7. Development of quantum control methods to avoid decoherence and average out internal interactions
8. Entanglement in spin-1/2 chains
9. Foundations of quantum mechanics

If you want to read some of my recent papers, go to the page: http://arxiv.org/ and in the empty space on the right (Search or Article-id) enter one of these numbers:

0910.2985 *Onset of quantum chaos in one-dimensional bosonic and fermionic systems and its relation to thermalization*

0903.2459 *Transport and Control in One-Dimensional Systems*

0810.4560 *Interplay between interaction and (un)correlated disorder in one-dimensional many-particle systems: delocalization and global entanglement*

0805.4045 *Transport Control in Low-Dimensional Spin-1/2 Heisenberg Systems*

0804.0890 *Advantages of Randomization in Coherent Quantum Dynamical Control*

0801.0992 *Long-time electron spin storage via dynamical suppression of hyperfine-induced decoherence in a quantum dot*