PHYS 533 FINAL PAPER: SUGGESTED TOPICS

The following are potentially interesting topics for final papers; I’ll probably add more in the next few days. Remember the deal from the midterm papers: these papers should be no more than 10 pages, and should be based on at least two papers from the recent literature. **The point is not for you simply to paraphrase the journal articles.** Rather, **you should analyze and synthesize** based on them. For example, you could compare and contrast the approaches in two papers, or you could explain how one builds on the work of the other. You can apply your critical faculties: if there’s something about one of the papers that you don’t like, or think was treated inappropriately, or think should have been considered but wasn’t, feel free to expound. Make sure to provide a little introductory material, and *always* be careful about citing other peoples’ work. Final papers will be due Friday, December 8, 2006, and *should include a signed honor pledge!*

I strongly suggest using ISI’s World of Knowledge (the online, searchable Science Citation Index) to help hunt for papers of interest and chase references. This database is accessible within the Rice web from the Fondren Library “Electronic Indexes” page.

**Topics:** These are suggested topics, you may choose to develop you own topic that is not included in this list.

- Sensing with single-electron devices
- Single-molecule transistors
- Electrochemically gated single-molecule devices
- Switching and negative differential resistance in molecular devices (incl. recent results).
- Nonvolatile molecular memories (incl. recent results).
- Solid state approaches to quantum computation (quantum dots, “cooper pair boxes”, “flux qubits”, Kane-style solid state NMR).
- Extraordinary magnetoresistance.
- Ballistic magnetoresistance.
- Single-molecule magnets.
- Manipulation of magnetization by current.
- Spin transistors
- Molecular spintronic devices