Symmetry, Order, Disorder.

Syllabus of the course 689, spring 2011.
Spring 2011.

Instructor Valery Pokrovsky

3. Goldstone modes and hydrodynamic description.
5. Phase transition and critical phenomena.
7. Topological phase transitions.
10. Weak localization.
12. Topological insulators.


Some topics for presentations:
1. Order in liquid crystals. How the LC work in monitors and TV screens?
2. Vortices in superconductors and superfluids.
3. Incommensurate crystals and Quasicrystals.
4. Order and disorder in cooled atomic gases.
5. Weakly interacting disordered Fermi and Bose gases.
6. Aharonov-Bohm oscillations in disordered systems.
7. Solid-on-solid model and its connection with planar magnet model.
8. New topological insulators and their properties.
10. Higgs phenomenon and Higgs particles.
11. Supersymmetry.

The knowledge of statistical physics and quantum mechanics is prerequisite (courses 606, 408 and desirable, but not necessary 624).

This course has mainly the purpose of information for interested people. No exams are planned. Instead each listener will deliver a presentation on a topic of her/his choice from a list provided by Instructor. The successful presentation and active participation in the class work give the grade A. Poor understanding of presentation,
passive behavior in class and/or missing more than 25% but less than 40% of classes will be estimated by C. No presentation and missing more than 40% of class give the grade D.