Superconductivity: Quantum Mechanics at a Human Scale

Free Public Lecture
Wednesday July 9th, 7pm
Room G1B20, Duane Physics Building
University of Colorado, Boulder

levitating superconductor above a magnet

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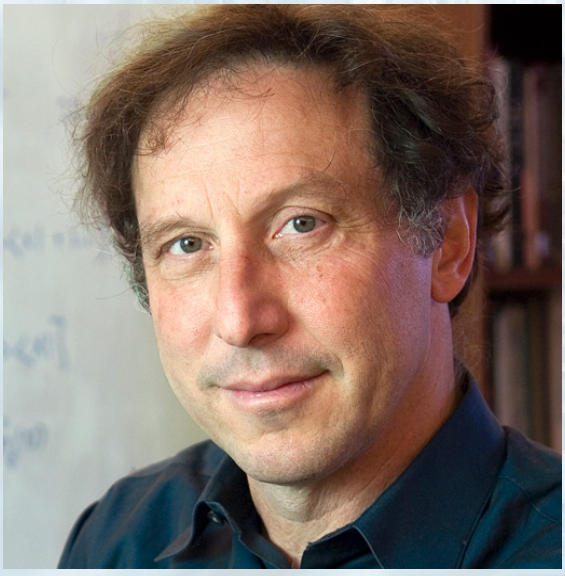
Superconductivity is, perhaps, the most astonishing while at the same time directly measurable quantum mechanical phenomenon. It has, moreover, a wide array of applications. Electrical current can circulate in a superconducting ring "forever," without any input of energy. Superconductivity is also among the most vivid examples of the principle of "emergence": Lead changes from a metal to a superconductor at a certain, very very cold critical temperature, T_c, although the motion of the electrons in a lead wire at temperatures greater than T_c is hardly different than at slightly lower temperatures. Superconductivity is thus a collective property that is so subtly related to the motions of the individual electrons as to be almost logically distinct -- much like the relation between the individual and a crowd. Until the discovery of "high temperature superconductivity" in 1986, all known superconductors required such low temperatures that air, itself, is frozen solid -- now, however, we can make superconductors that you can touch with your hand (although very quickly if you don't want a nasty frost-burn) as you may have an opportunity to do in this lecture!



Professor Steven Kivelson

- *One of the world experts on the fascinating physics of superconductivity*
- *Professor of Physics at Stanford University.*
- *Fellow of the National Academy of Sciences and the American Academy of Arts and Sciences*
- *Recipient of the Bardeen Prize and of the Guggenheim, Sloan, and Humboldt Fellowships*
- *Being a theorist it is likely that nothing he does will be directly useful for any purpose other than to advance human understanding of the physical world – that is a lofty enough goal.*

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