



Joint CNMS DISCOVERY / NCCS SEMINAR

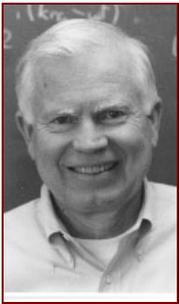
In collaboration with the

SNS AND MATERIALS SCIENCE AND TECHNOLOGY DIVISION

Friday, May 25, 2007

11:00 am

Iran Thomas Auditorium, 8600



“The Name of the Rose---Spin-fluctuations” *

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Abstract: Numerical studies of the two-dimensional Hubbard model show that it exhibits the basic phenomena seen in the cuprate materials. At half-filling one finds an antiferromagnetic Mott- Hubbard groundstate. When it is doped, a pseudogap appears and at low temperature d-wave pairing and striped states are seen. In addition, there is a delicate balance between these various phases. Here we begin by reviewing the evidence for this. Then we examine what numerical studies tell us about the structure of the interaction that is responsible for pairing in the Hubbard model and discuss it's relevance to the cuprate problem. We conclude that the d-wave pairing interaction in the high T_c cuprates arises from the exchange of short-range antiferromagnetic spin- fluctuations. This has not always been a popular view*.

* “There was a heretical word in a secret book locked in the library of the abby that if read or uttered meant death.” Umberto Eco, The Name of the Rose.

Doug Scalapino received his Ph.D. from Stanford University in 1961. In 1964 he joined the faculty at University of Pennsylvania and became a Professor of Physics in 1968. Since 1969, he is a Professor at the University of California, Santa Barbara. Prof. Scalapino is a member of the National Academy of Sciences, a Fellow of the American Physical Society and the American Academy of Arts and Sciences. He is the recipient of a number of awards, including the Julius Lilienfeld prize in 1998 and the Bardeen prize in 2006.

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