Ganapathy Baskaran

Wishing you many more years of resonance with quantum matter

ICTP Prize, 1983

for important
contributions to the
theory of
antiferromagnetic
insulators,
phase transitions in
condensed matter
and
lattice gauge theories.

VOLUME 56, NUMBER 25 PHYSICAL REVIEW LETTERS 23 JUNE 1986

Cooperative Ring Exchange and the Fractional Quantized Hall Effect in an Incompressible Fluid

G. Baskaran

Department of Physics, Princeton University, Princeton, New Jersey 08544

(Received 15 November 1985)

We show that the cooperative-ring-exchange phenomenon and the consequent fractional quantization as suggested by Kivelson *et al.* can persist in a quantum fluid which is incompressible, like the Laughlin state. Simple arguments are given to suggest that the very existenct of the cooperative ring exchange may imply a melting instability of the triangular Wigner solid towards an incompressible fluid.

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Fractionalization and emergent gauge fields in the quantum Hall effects

(Chern-Simons term allows deconfined phases of gauge fields)

Gauge theory of high-temperature superconductors and strongly correlated Fermi systems

G. Baskaran and P. W. Anderson
Joseph Henry Laboratories, Department of Physics, Jadwin Hall, Princeton University,
P.O. Box 708, Princeton, New Jersey 08544
(Received 6 July 1987)

In this paper we show that the development of resonating-valence-bond correlations and the subsequent superconducting order in the high-T_c oxide superconductors are described by an U(1) lattice-gauge theory. The insulating state has an almost-local gauge symmetry and doping changes this to a global symmetry, which is spontaneously broken at low temperatures, resulting in superconductivity. New topological excitations associated with the singlet field are found.

$$F \approx a\sum |\Delta_{ij}|^2 + b\sum |\Delta_{ij}|^4 + c\sum (\Delta^*_{ij}\Delta_{jk}\Delta^*_{kl}\Delta_{li} + \text{H.c.}) + \cdots .$$

$$W(C) = \langle b^\dagger_{ij} b_{jk} b^\dagger_{kl} \cdots b_{ni} \rangle = \langle \Delta^*_{ij}\Delta_{jk}\Delta^*_{kl} \cdots \Delta_{ni} \rangle$$

Fractionalization and emergent gauge fields with time-reversal symmetry

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Fractionalization and emergent gauge fields with time-reversal symmetry

(Needs higgsing to discrete gauge symmetry or quantum criticality for deconfinement in 2+1 dimensions - N. Read, S.S. 1989,90)

Toshali Sands, Puri, India
Winter school on ‘Electronic Correlation and Disorder Effects in Metals’, January 1989
S. N. Behera (World Scientific)

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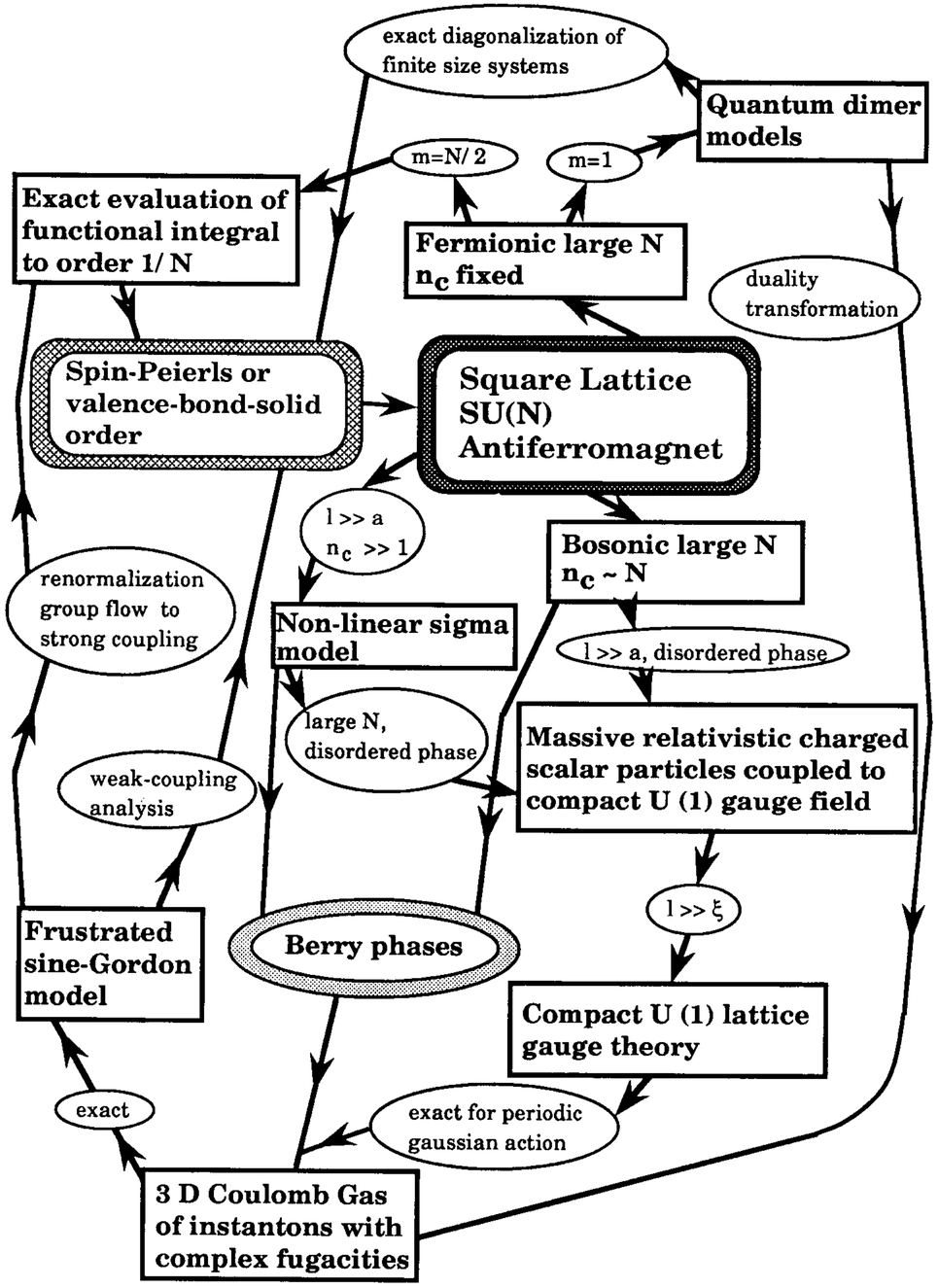

S. Sachdev, Fig 9

Perimeter Institute, 2013

Spin quartets

3 South Indians and 1 North Indian

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