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Participation of scientists from U.S.A. at XVIII International Workshop on Condensed Matter Theories held at Valencia, Spain, June 6-10, 1994. The proceedings will be published in vol. 10 of Condensed Matter Theories.
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Final Report: Grant No. DAAH04-94-G-0029
XVIII. International Workshop on Condensed Matter Theories

The grant enabled 8 scientists from the U.S.A. to participate at the XVIII. International Workshop on Condensed Matter Theories held at Valencia, Spain in June 1994. Without this grant the U.S. participation at the workshop would have been very minimal. The grant allowed U.S. scientists to interact effectively with their international counterparts.

The list of the scientists from the U.S.A. who have been supported by the grant is attached in Appendix 1 and the program of the workshop is listed in Appendix 2. Participants from the U.S.A. receiving the grant have acknowledged that in their respective articles, which are attached in appendix 3.

Copies of the articles containing the subject matter presented by the participants supported by the grant are attached in Appendix 3. All presentations were invited talks. These articles have been accepted for publication in Condensed Matter Theories Vol. 10. The publisher, Nova Science Publishers, Commack, New York, expects to bring out the volume shortly.

In keeping with the objective of the grant, emphasis was placed on theories related to high temperature superconductivity, molecular dynamics simulation in multi-molecular system, quantum fluid at zero and low temperature, Bose condensation, and advances in methodology. In addition, talks on the use of maximum entropy principle to describe cooperative phenomena were presented. A large number of scientists from the host country, Spain and Europe participated actively.

The Workshop also helped to foster another key objective of bringing together scientists working in different areas of physics in order to facilitate interchange of ideas. The Workshop was very effective in cross fertilization of ideas and development of new interests. For example, Dr. de Llano, originally a nuclear physicist, presented a definitive talk on the role of pairs in

BCS theory. Dr. Glyde's research is collaboration with scientists from the U.K., Japan and France. The principle investigator, originally an atomic and nuclear physicist, presented a talk related to compressibility of neutrons. Another objective of the workshop, namely to serve as a forum to initiate collaborative research in the area of condensed matter theories, has also been fulfilled.

Thus, the purpose and objective of the grant have been successfully achieved.

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Appendix 1

Name of the participants supported by the grant.

Appendix 1

1. Dr. George A. Baker, Los Alamos National Laboratory, Los Alamos, NM.
2. Dr. Robert G. Brown, Duke University, Durham, NC.
3. Dr. John W. Clark, Washington University, St. Louis, MO.
4. Dr. Manuel de Llano, North Dakota State University, Fargo, ND.
5. Dr. H.R. Glyde, University of Delaware, Newark, DE.
6. Dr. E. Krotscheck, Texas A & M University, College Station, TX.
7. Dr. F. B. Malik, Southern Illinois University, Carbondale, IL.
8. Dr. Priya Vashishta, Argonne National Laboratory, Argonne, IL.

Appendix 2

The program of the XVIII International Workshop on Condensed Matter Theories held at
Valencia, Spain.

XVIII INTERNATIONAL WORKSHOP ON CONDENSED MATTER
THEORIES

Valencia, Spain, 6-10 June 1994

MONDAY 6

8:00-9:00: REGISTRATION

9:00-9:30: OPENING SESSION

9:30-10:15: S. Hernández (Buenos Aires, Argentina), *Landau theory of Fermi liquids at finite temperature: Thermodynamics and linear response*

10:15-11:00: E. Bashkin (Marburg, Germany), *Thermodynamics of a superfluid Bose gas*

11:00-11:30: **Coffee Break**

11:30-12:15: P. Tarazona (Madrid, Spain), *Density functional approximations for classical and electronic systems*

12:15-13:00: N. Nafari (Tehran, Iran), *Nonlocal density functional theory and metal clusters*

13:00-13:30: POSTER SESSION

13:30-15:30: **Lunch**

15:30-16:15: J. Treiner (Paris, France), *Wetting properties of liquid helium: A density functional study*

16:15-17:00: M. Barranco (Barcelona, Spain), *A Vlasov approach to ^3He - ^3He cluster collisions*

17:00-17:30: F. Dalfovo (Trento, Italy), *Density functional in liquid helium: Recent applications to droplets and surfaces*

17:30-18:00: **Coffee Break**

18:00-18:45: S. Rosati (Pisa, Italy), *Study and calculations on light nuclei*

18:45-19:15: J.M.G. Gómez (Madrid, Spain), *The neutron halo of light nuclei*

19:15-19:45: A. Poves (Madrid, Spain), *Missing and quenched Gamow Teller strength*

TUESDAY 7

9:00-9:30: C.M. Bowden (Redstone, USA), *Generalized Maxwell-Bloch formulation for semiconductor lasers*

9:30-10:15: R. F. Bishop (Manchester, UK), *Two-body correlations in Quantum many-Body systems: A confrontation between different techniques*

10:15-11:00: G.A. Baker Jr. (Los Alamos, USA), *Many-body perturbation theory for the pressure of an electron-ion system*

11:00-11:30: **Coffee Break**

11:30-12:15: H. R. Glyde (Newark, USA), *Excitations, momentum distributions and the condensate in liquid ^4He*

12:15-13:00: M. L. Ristig (Cologne, Germany), *Correlated density matrix theory of superfluid ^4He*

13:00-13:30: J. Boronat (Barcelona, Spain), *Equation of state of liquid ^4He at positive and negative pressures*

13:30-15:30: Lunch

15:30-16:15: B. Clements (Grenoble, France), *Bose Quantum Films at Finite Temperature*

16:15-17:00: M. Saarela (Oulu, Finland), *Elementary excitations and phase transitions in two-dimensional ^4He and thin ^4He films*

17:00-17:30: K.A. Gernoth (Trieste, Italy), *Temperature dependence of the surface tension of liquid ^4He*

17:30-18:00: Coffee Break

18:00-18:45: W.H. Dickhoff (St. Louis, USA), *New developments with self-consistent Green's functions*

18:45-19:15: E. Moya de Guerra (Madrid, Spain), *Quark distributions in bound nucleons and the many-body problem*

19:15-19:45: M. Modarres (Tehran, Iran), *The effects of nucleon-nucleon correlation and quark-exchange on the quark distributions in nuclei*

WEDNESDAY 8

9:00-9:30: G. Anagnostatos (Attiki, Greece), *Cluster approach to atomic nuclei: Alpha-chain states*

9:30-10:15: J.A. Alonso (Valladolid, Spain), *Non-local functionals for exchange and correlation in density functional theory. Application to atoms and to small atomic clusters*

10:15-11:00: E.V. Ludeña (Venezuela, Venezuela), *Generation of approximate energy-density functionals for atoms by means of local-scaling transformations*

11:00-11:30: Coffee break

11:30-13:30: **Special session.** *Microscopic and phenomenological approaches to DFT*

S. Stringari (Trento, Italy), *Time dependent density functional theory in quantum liquids*

E. Krotscheck (College Station, USA), *From density functionals to diagrams: Practical considerations on theory issues*

14:00: Lunch in a restaurant on the beach. Trip to the Albufera.

20:00: Concert at the Paraninfo. Duo Royo-Stryja (Flute and Piano).

THURSDAY 9

9:00-9:30: R.K. Kalia (Baton Rouge, USA), *Morphology of pores and fracture surfaces in porous silica-multimillion particle molecular-dynamics simulations*

9:30-10:15: H. G. Miller (Pretoria, South Africa), *Finite size effects in polycrystalline high T_c materials*

10:15-11:00: P. Vashishta (Baton Rouge, USA), *Effect of orientation disorder and pressure on phonons in solid C₆₀ and graphite tubules. A tight binding molecular dynamics study on parallel computers*

11:00-11:30: Coffee Break

11:30-12:15: N.H. March (Oxford, UK), *Magnetically induced electron crystals and the anion model*

12:15-13:00: R. Brown (Durham, USA), *Heat bath Monte Carlo studies of critical dynamics and statics in the classical Heisenberg ferromagnet*

13:00-13:30: Y. Xian (Manchester, UK), *Theory of valence-bond lattices on spin lattices*

13:30-15:30: Lunch

15:30-16:15: M. de Llano (Fargo, USA), *Quantum binding of the BCS model interaction*

16:15-17:00: M. Ciftan (Durham, USA), *The quantum dynamics of spin systems using the coherent state representation*

17:00-17:30: Y. Takada (Tokyo, Japan), *Strong coupling theory for superconductivity with vertex corrections*

17:30-18:00: Coffee break

18:00: Business Meeting, IAC and LOC members

FRIDAY 10

9:00-9:30: A. Ramos (Barcelona, Spain), *Two body propagation in nuclear matter*

9:30-10:15: H. Müther (Tübingen, Germany), *Correlations and relativistic effects in the many-body theory of nuclear systems*

10:15-11:00: A. Fabrocini (Pisa, Italy), *CBF theory of the spin responses in nuclear matter*

11:00-11:30: Coffee Break

11:30-12:15: J. W. Clark (St. Louis, USA), *Statistical modeling of nuclear masses with neural network algorithms*

12:15-13:00: A. Plastino (La Plata, Argentina), *Information theories and semi-classical approaches*

13:30-15:30: Lunch

15:30-16:15: H. Roeder (Bayreuth, Germany), *Statistical methods for mega-dimensional hamiltonians*

16:15-17:00: F.B. Malik (Carbondale USA), *Collisions of nuclei and nuclear compressibility*

17:00-17:30: CLOSURE SESSION

Appendix 3

Copies of the Articles Containing Materials Presented at the Workshop by Participants Supported
by the Grant.