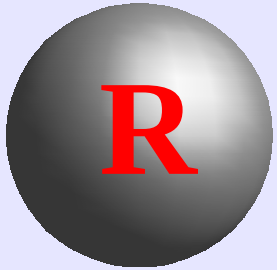
Programme: CERES (Economic and Social Research)
Sponsor: MEC (Ministry of Education and Research, Romania)

PROJECT #65:

BASIC THEORETICAL RESEARCH in FOREFRONT PROBLEMS of CONDENSED MATTER

(October 15, 2001-December 30, 2003)



INTERIM REPORT

October 2001-December 2002

DESCRIPTION

Project #65

Coordinator: M. Apostol

Affiliation: Institute of Physics, Magurele-Bucharest

Funds: 2.7 bls lei (~80.000 $),

Duration: 2 years, 2 months, 2 weeks

Scientific Researchers: 8

Results: 2 books, 14 papers, 5 communications

PUBLICATIONS

BOOKS

1 M. Apostol
Journal of Theoretical Physics, Selected Papers, 2001-2002, *apoma* MB (2002)

2 M. Apostol
Antiphysical Review, 2001-2002, *apoma* MB (2002)

ARTICLES

1 Bose-Einstein condensation and superfluidity
M. Apostol
J.Theor. Phys. 72 81 **(2001)**

2 On quantal trajectories and chemical reactivity
M. Apostol
J. Theor. Phys. 73 92 **(2001)**

3 On the rate of the chemical reactions and the teleportation of the wavepackets
M. Apostol
J. Theor. Phys. 74 96 **(2001)**

4 On the Levenberg-Marquardt minimization procedure
M. Apostol
J. Theor. Phys. 75 101 **(2002)**

5 Electric flow through a ferromagnet-superconductor junction
M. Apostol and L. C. Cune
J. Theor. Phys. 76 103 **(2002)**

6 **Metallic clusters deposited on surfaces**
L. C. Cune and M. Apostol
J. Theor. Phys. 77 125 **(2002)**

7 **Atomic clusters and nanostructures**
L. C. Cune and M. Apostol
J. Theor. Phys. 78 133 **(2002)**

8 **Metallic clusters deposited on durfaces**
M. Apostol
J. Theor. Phys. 79 153 **(2002)**

9 **Metallic Clusters deposited on surfaces**
L. C. Cune and M. Apostol
J. Theor. Phys. 82 1 **(2002)**

10 **Spherical limit of anisotropic n-vectorial models**
N. Angeelscu, M. Bundaru, G. Costache
J. Math. Phys. (2002) in print

11 **Pyrochlore antiferomagnet in spherical approximation**
N. Angelescu, M. Bundaru, G. Cosatche
J. Phys A: Math. Phys. (2002) in print

12 **Nanostructures and Nano-Objects**
L. C. Cune and M. Apostol
Nanotechnology (2002), submitted

13 **Quanta of viscosity**
M. Apostol
Roum. J.Phys. 46 339 (2001)

14 **Atomic clusters**
L. C. Cune and M. Apostol
Roum. J. Phys. 46 345 (2001)

COMMUNICATIONS

1 **Self-Consistent Approach to Quantum Charges in Magnetic Field, N. Angelescu**
Institute of Advanced Studies, Dublin, IRELAND

2 **Self-Consistent Diamagnetism and Surface Currents, N. Angelescu**
Rutgers University, New Brunswick, USA

3 **Hartree-Fock Approximation to Bogoljubov Model, M. Bundaru**
W. Goethe University, Frankfurt, GERMANY

4 **Lattice Spins, F. D. Buzatu**
Institute of Atomic Physics, Bucharest, ROMANIA

5 **Nanostructures Deposited on Surfaces, M. Apostol**
NATO-Puszczykowo, POLAND

Please Note:

1 2 publications per person per year

2 All these are ORIGINAL, NEW and PUBLICLY CHECKED with the International Scientific Community

3 Made at MAGURELE

4 The Scientific MAIN STREAM passes through MAGURELE

How to judge a Scientific Publication?

1 There exists SCIENCE in this World

2 Science is POSITIVE KNOWLEDGE TOTAL

3 A "Good" Scientific Publication is what is NEW and CORRECT in SCIENCE

4 It is judged by SCIENTISTS, not the Clerks of the Scientific Research

5 How do we the laymen recognize a Scientist?

6 By his/her POSITIVE KNOWLEDGE

What about Scientometrics?

Scientometrics is a very Limited Tool of Assessing The Scientific Research

Please note that Scientific Research is Distinct from Science

Scientific Research is a Thermal Engine: its output is

1% SCIENCE and

99% Non-Science

Multi-Component Phases

G. Costache

$$-J_{ij}\sum_{\mu=1}^{n}\sigma_{i\mu}\sigma_{j\mu}-\sum_{\nu=1}^{k}B_{ij}^{\nu}\sigma_{in+\nu}\sigma_{jn+\nu}$$

This is a Fundamental Result

because:

Successive phase transitions on decreasing temperature:
Distinct interactions

The present result: the same interaction

Key Words: Ferromagnetism, Mean Field,
Multiple (Orientational) Order Parameters, Magnetic Sensors

Pyrochlore Problem

(N. Angelescu, M. Bundaru)

Fundamental Long-Standing Problem

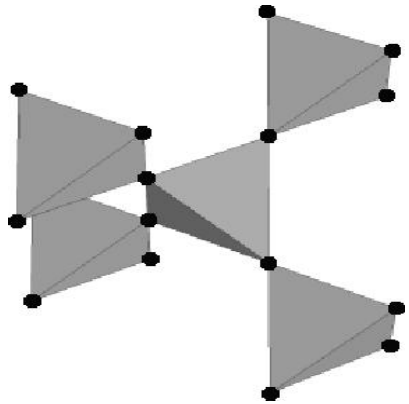
because:

Complex (disorder, frustration, ferro, antiferro and dipole)

ANISOTROPIC MAGNETIZATION

Four Order Parameters , Zero Magnetization

$Gd_2Ti_2O_7$



MAIN RESULT: Magnetization Anisotropy

Nanostructures, Nano-Objects and Nanotechnologies

The most active field today in Cond Matt

Nano=10^{-9} = 10 Angstroms (today limit 1500 Angstroms~0.15μ)

Bottom-Up Approach, Chemistry become Quantal finally!

Direct Control of Atomic Processes

Enormous Potential because Avogadro's number is pretty

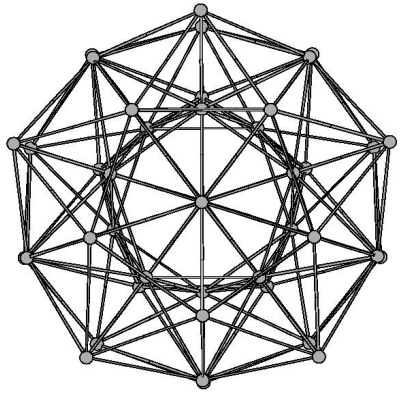
GREAT 10^{23}

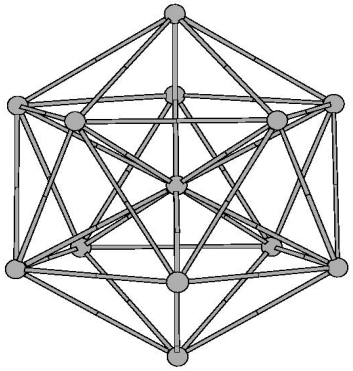
Materials, Processes and Devices

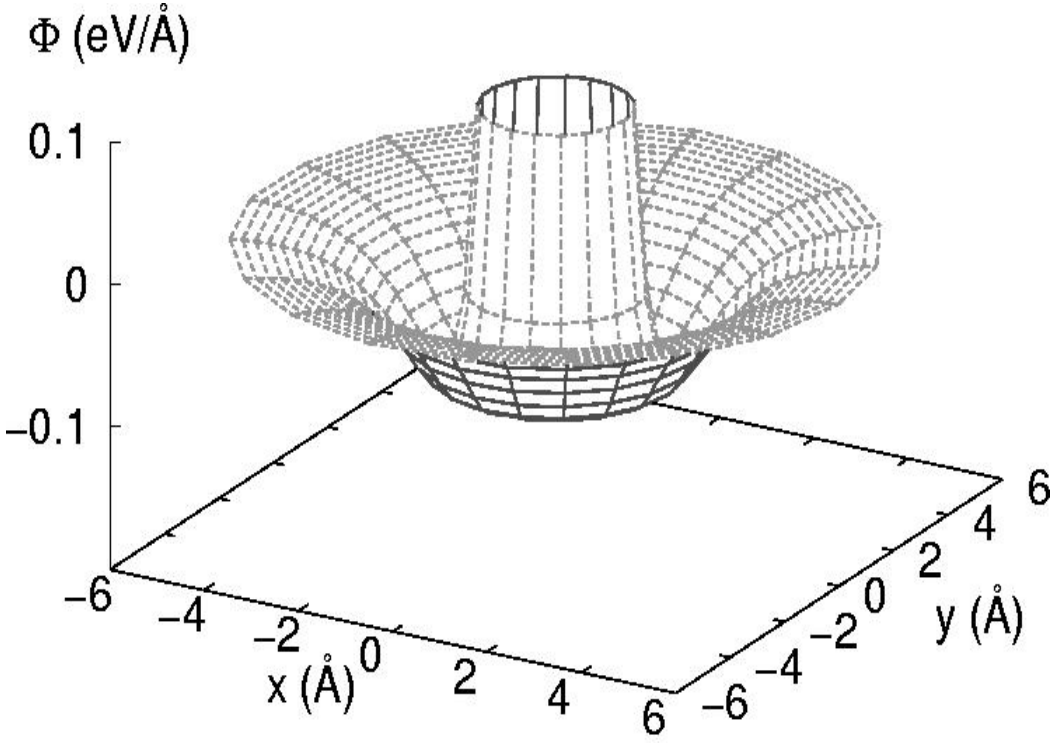
There is plenty of room at the bottom - Feynman 1959

We are making NANO at Magurele

(L. C. Cune)





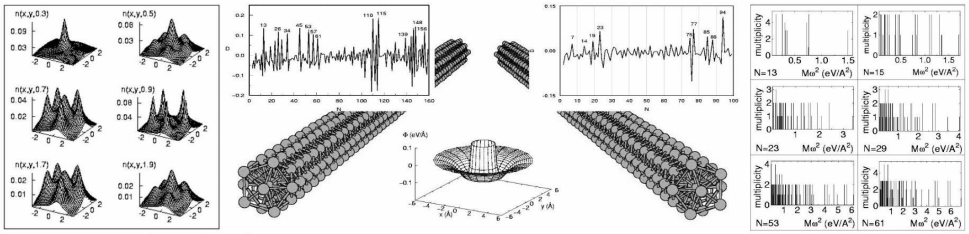


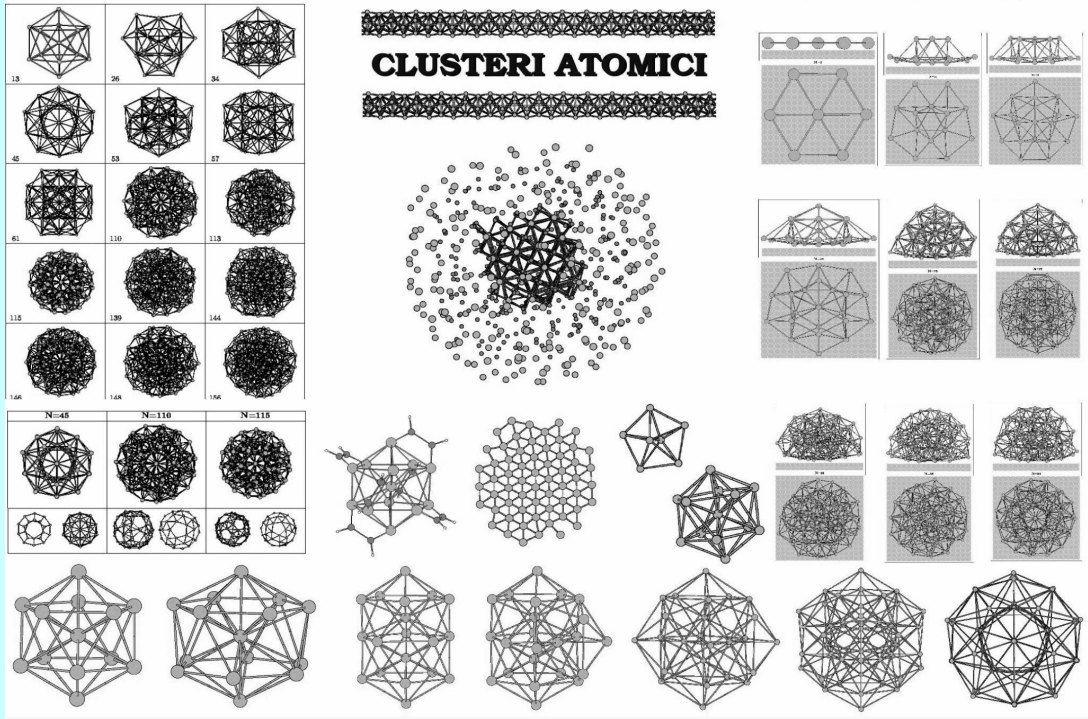
Cune Potential

$$\Phi_{ij} = -\frac{1}{2} z_i^* z_j^* q \left(1 - \frac{2}{q\left|\mathbf{r}_i - \mathbf{r}_j\right|}\right) e^{-q\left|\mathbf{r}_i - \mathbf{r}_j\right|}$$

GUVERNUL ROMANIEI
MINISTERUL EDUCATIEI SI CERCETARII

SESIUNEA STIINTIFICA ANUALA
A PROGRAMULUI CERES
(28-29 noiembrie 2002)





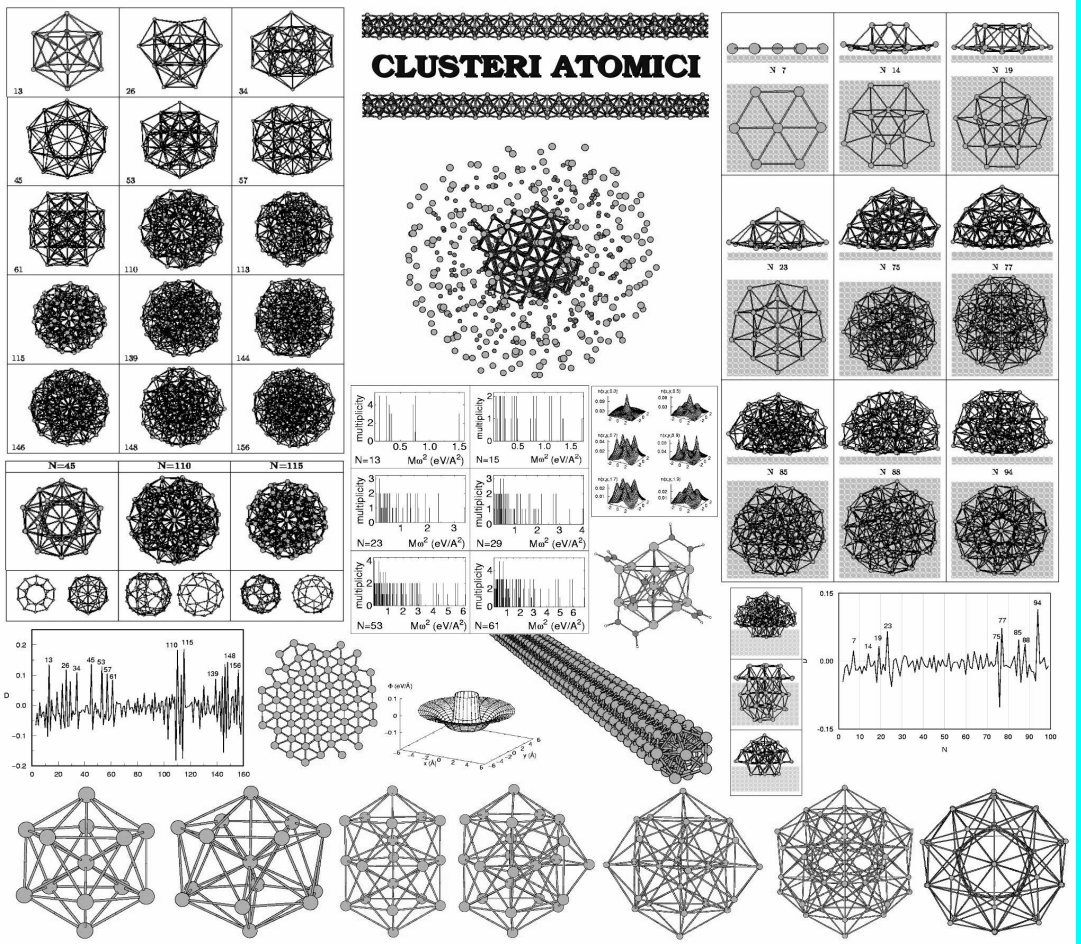
- TEMA: CERCETARI TEORETICE FUNDAMENTALE ASUPRA UNOR PROBLEME ACTUALE DE MATERIE CONDENSATA
- FINANTAT IN CADRUL PROGRAMULUI CERES NR. 65/2001

Director de proiect: Prof. M. Apostol

ORGANIZATORI:

GUVERNUL ROMANIEI
MINISTERUL EDUCATIEI SI CERCETARII

SESIUNEA STIINTIFICA ANUALA
A PROGRAMULUI CERES
(28-29 noiembrie 2002)



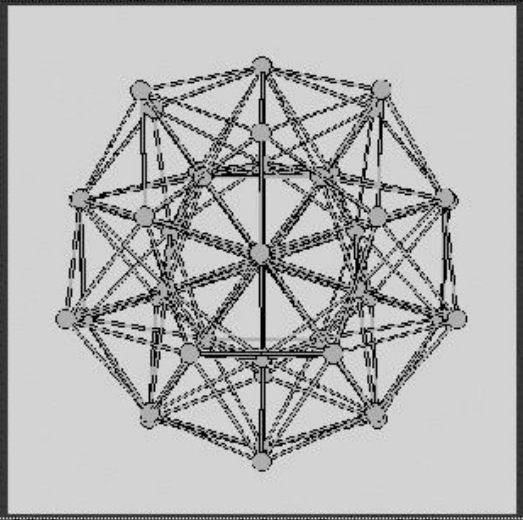
TEMA: CERCETARI TEORETICE FUNDAMENTALE ASUPRA UNOR PROBLEME ACTUALE DE MATERIE CONDENSATA

FINANTAT IN CADRUL PROGRAMULUI CERES NR. 65/2001

Director de proiect: Prof. M. Apostol

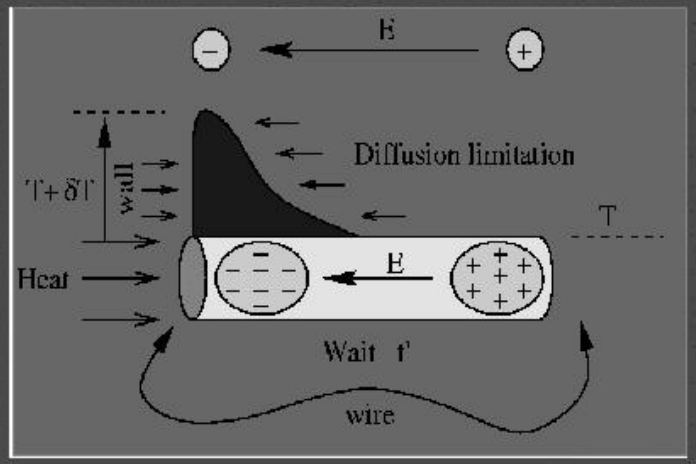
ORGANIZATORI:

Atomic Clusters



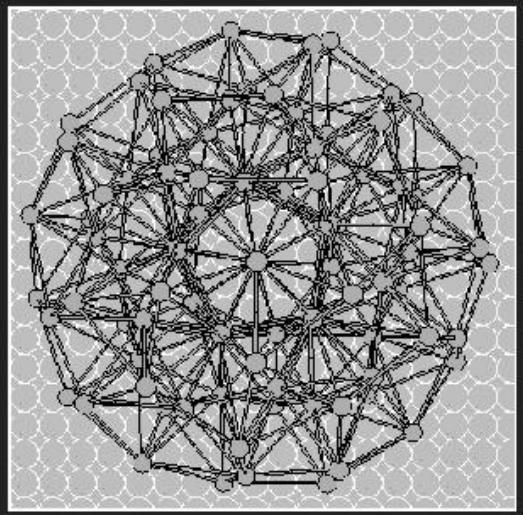
www
Cluster Album
Phys. Lett. A273 117 (2000)

Thermoelectrics



Slideshow

Metallic Clusters Deposited on Surfaces



Field Induced Superconducting Transistor

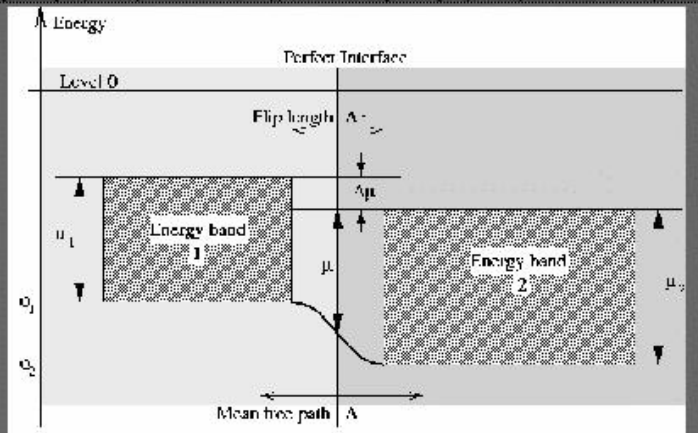
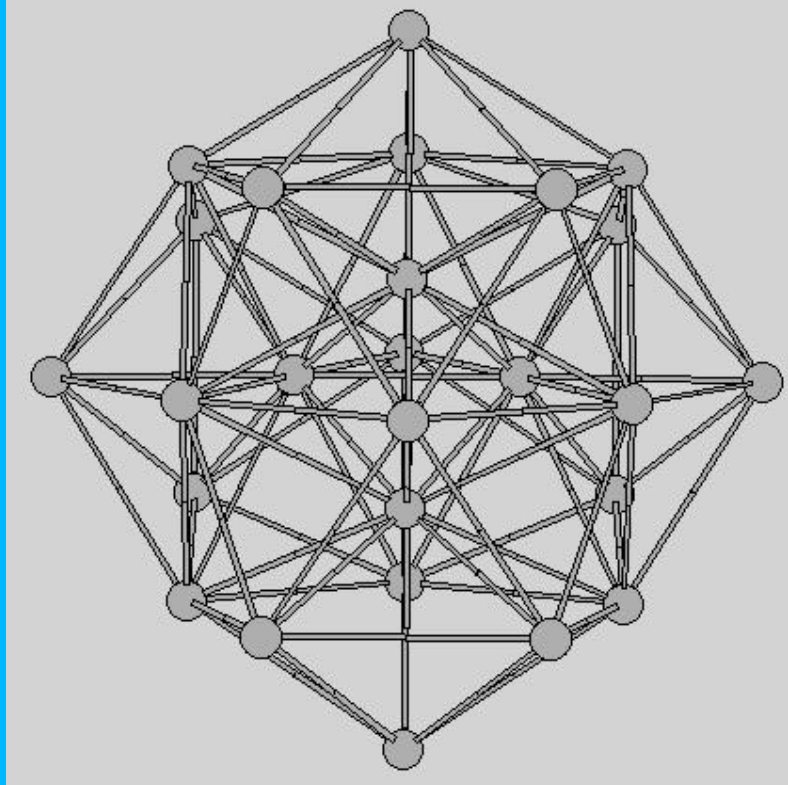
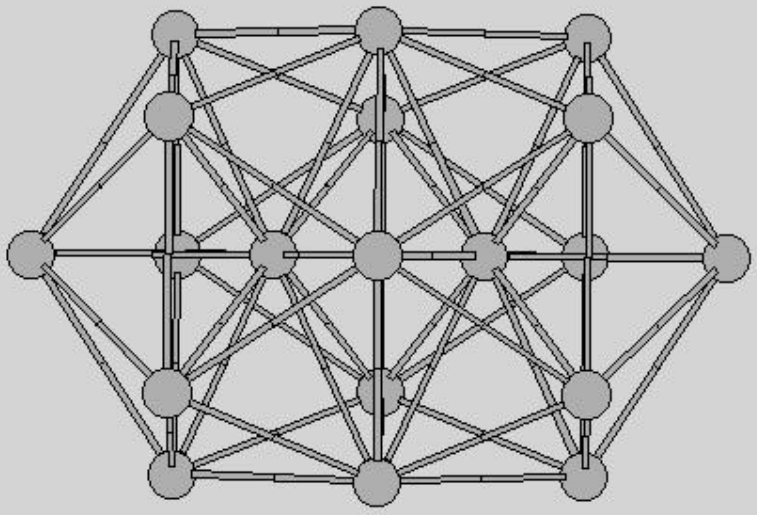
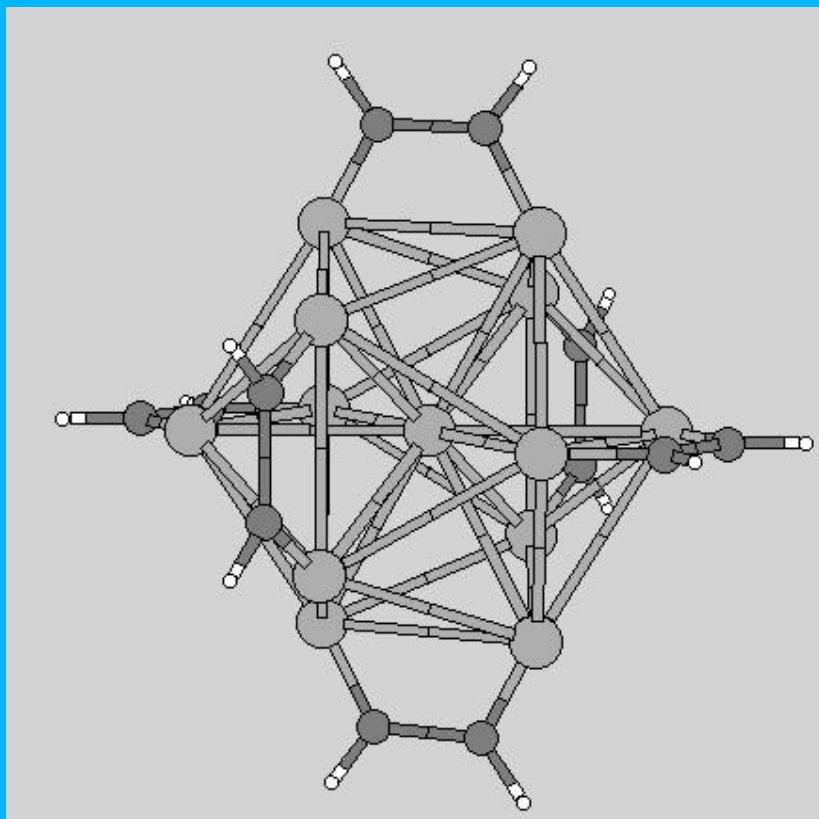


Fig.3. Two Solids with a Perfect Contact

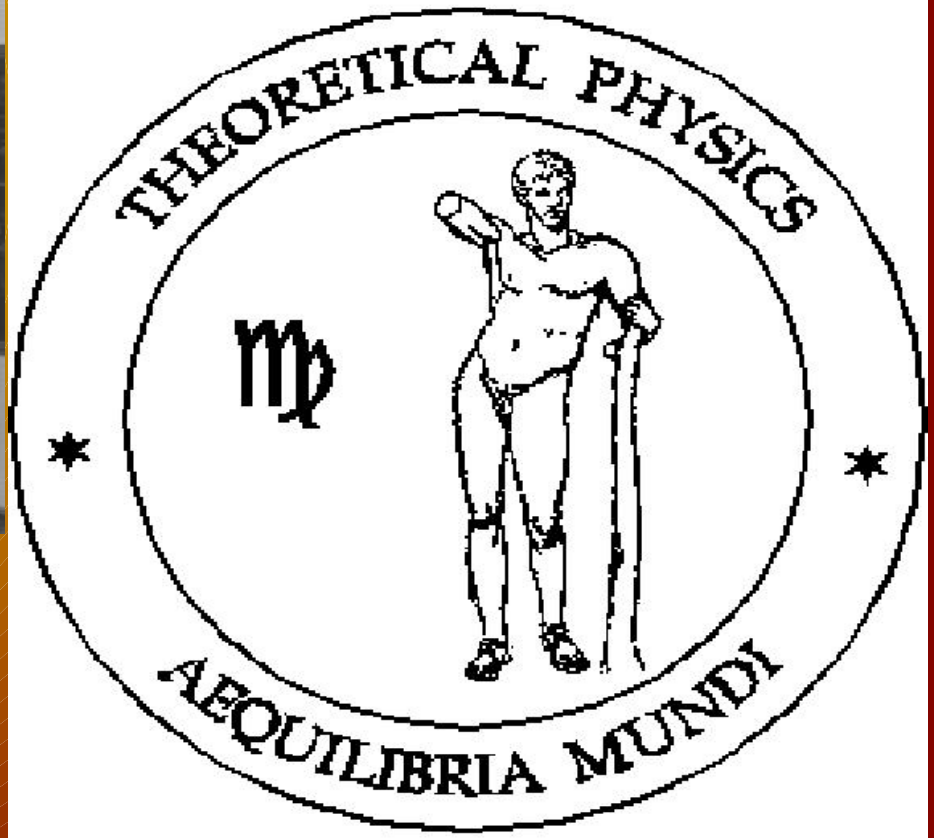
L.C. Cune M. Apostol







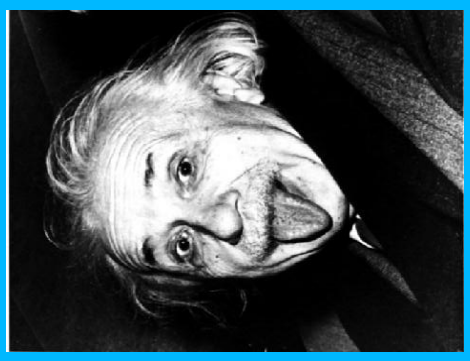
THEORY of CONDENSED MATTER

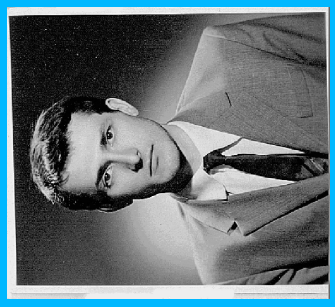


http://www.theory.nipne.ro/CMP

apoma@theory.nipne.ro

An empty Table and a few Heads





Marian Apostol

Professor of Theoretical Phyiscs

Institute of Atomic Physics, Magurele-Bucharest, Romania

Magurele-Bucharest MG-6, POBox MG-35, Romania, tel: -40-21-404 23 00/3213, fax:-40-21-457 44 40, apoma@theory.nipne.ro, http://www.theory.nipne.ro/~apoma

Laboratory of Condensed Matter
Theory of Condensed Matter Laboratory
Laboratory of Nanostructures
ThermoLab

members of:

NANOELECTRONICS, PHANTOMS European Network of Excellence, CMP Cientifica, Madrid, Spain, Information Society Programme

NANOSPIN European Network of Excellence in Magnetoelectronics, Spintronics and Nanomagnetism, CSIC, Madrid, Spain, Nanotechnologies Programme

NANOREACH European Network of Ecellence in Nanoscale Characterization, Faraday Partnership, Reading, UK, Nanotechnologies Programme

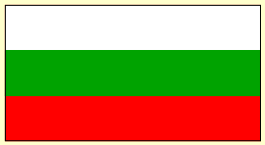
POLYCOMNET European Network of Excellence in Composite Materials, Strathclyde, Glasgow, Scotland, Nanotechnologies Programme

NANOSEASIDE European Network of Excellence in Self-Assembled Silicon Nanostructures, Marseille, France, Nanotechnologies Programme

MOLETRONICS European Integrated Research Project, PHANTOMS, CMP Cientifica, Madrid, Spain, Nanotechnologies Programme

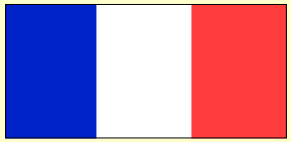
NAMTEC European Network of Excellence on Thermoelectrics, Cardiff, Wales, Ireland, Nanotechnologies Programme

Our Collaborations



Bulgaria

China



France

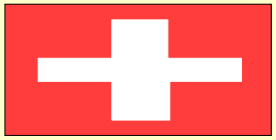
Germany

Great Britain

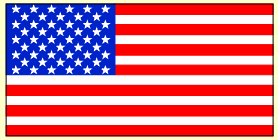
Italy

Poland

Russia



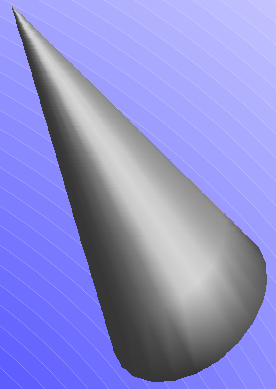
Switzerland

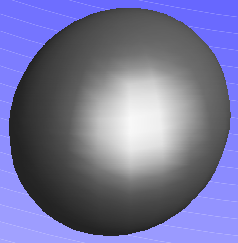


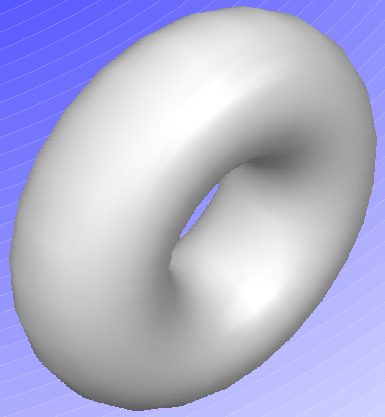
USA

What is Wrong with CERES?

1. Equalization=Red Communism
2. Democracy? Science is Aristocracy
3. Salaries through Competition
4. Invasive Character: Good Researchers, Bad Reviewers, and Viceversa
5. Anti-Scientific Character
6. Anti-Social Character: Secrecy of Reviewers
7. Generalized Bureaucracy
8. Destroy Resources, Waste of funds, Inefficiency, Oligarchies, Corruption
9. Destructive Character







* **235 Years of Research Activity**

* **Scientific Degrees (including 3 professorship), properly obtained**

* **600 Scientific Publications**

* **Included in Books since ~1970,**
  Cited in Journals ~700 times

Who Judges these guys?

Are not they entitled to a salary in the Romanian Research?

Sergeants and Corporals command Generals

The Romanian Scientific Research is

the Red Army of Lenin

What is good in CERES

Dr. Th. Ionescu-Bujor

Prof. Voicu Grecu

Dr. Dan Savastru

a few others