INSTITUTE of PHYSICS and NUCLEAR ENGINEERING

NIPNE-Magurele, BUCHAREST

Laboratory of Condensed Matter

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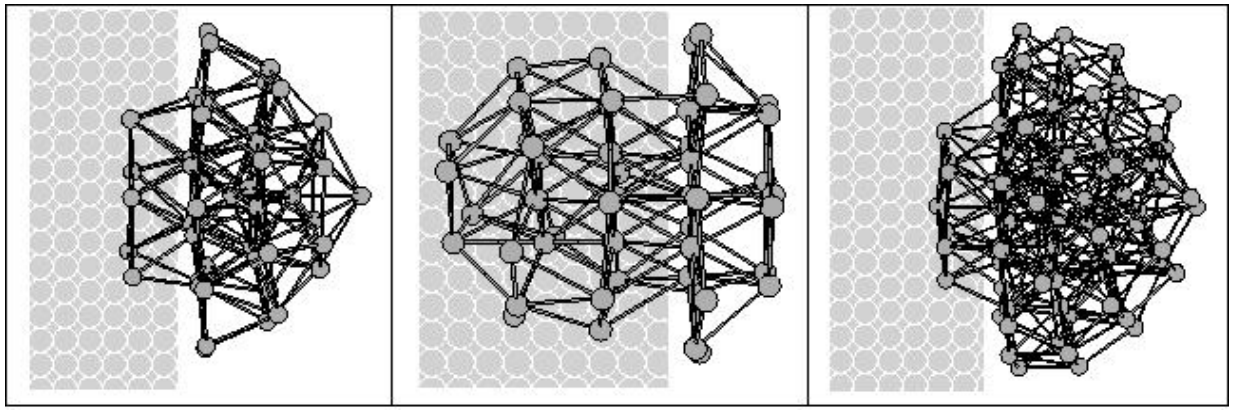
2003 NIPNE Conference

RESULTS

1- Atomic Clusters on Surfaces

2- Binding Energy for Heavy Atoms



50-atoms cluster diffusing into solid,
100-atoms developing an interface with solid

(Fe on K)

1. Theory of atomic clusters. Metallic clusters deposited on surfaces
   L. C. Cune and M. Apostol
   in *Low-Dimensional Systems: Theory, Preparation and some Applications*, eds L. M. Liz-Marzan and M. Giersig,
   Kluwer (2003), p. 1
2. Bose-Einstein condensation and superfluidity
   M. Apostol
   Roum. Reps. Phys. **48** Suppl 1 281 (2003)
3. Opening talk on the Course of Theoretical Physics, February 6, 2003
   M. Apostol
   J. Theor. Phys. **84** 1 (2003)
4. On linear anharmonic oscillators and self-consistent harmonic approximation
   M. Apostol
   J. Theor. Phys. **87** 1 (2003)
5. Advanced Materials
   M. Apostol
   J. Theor. Phys. **88** 1 (2003)

Field-Controlled Superconducting Transistor

M. Apostol and L. C. Cune, apoma, MB (2003)

Thermoelectricity

Conferences

1. **Theoretical Physics of Modern Materials**
   Int Conf Polymers&Adv Matrs, Bucharest, June 2003
2. **Despre stiinta, invatamint si cercetare in epoca noastra**, Colocviul Nat de Fizica, Politehnica Bucuresti, Septembrie 2003
3. **Stiinta si cercetarea stiintifica**
   Simpozion Academia Romana, Noiembrie 2003

Three Main Directions of Research in Physics

(National Research Council,USA (Academy of Sciences, Academy of Engineering, Institute of Health))

NANOSCIENCE

Electronic Biology-Individual Control

COMPLEX SYSTEMS

Planet Control

ASTROPHYSICS and COSMOLOGY

New Weapons, Sub-Nuclear Energies

Military Power

SIX CHAPTERS

Bose-Einstein Condensation

Simulation and Modelling of Complex Systems
(biological cell, climate, seismology, Planet, galaxies)

Biology (neural cell, genome)

New Materials

Astronomic Instruments

Fundamental Forces

Main Problems

Functional nano-objects, nano-diodes, -transistors
Nanoscience?

Electric activity of neural cell membrane

Superconductors, quasi-crystallines,
one- and two-dimensional materials

Self-assembling, turbulence, fracturation, adhesion

Stars, galaxies, Big Bang, dark matter, missing matter,
cosmic high energies, gravitational waves,
origin of chemical elements

Heavy quark, neutrino oscillations, strings,
grand-unification

RECOMMENDATIONS

1 USA Federal Government investing in Physics

2 Physics Education

3 Basic Research for National Security

4 Partnership

5 USA Federal Science Agencies for Core Research
(Small groups and individual, Large facilities and international cooperation)

6 Electronic databases and data-mining tools