

RESEARCH at Lomonosov Moscow State University

Dr. Svetlana Mamakina,

Deputy Vice-Rector



MOSCOW UNIVERSITY – IT IS:

30 Faculties

377 Departments

**9 Educational and
Scientific Centres**

**Scientific
library**

9 million volumes

Publishing House

**13 Research
Institutes**

**79 Divisions
and Sectors**

4 Museums

Science Park

Botanical Garden



MOSCOW UNIVERSITY – IT IS:

Faculty and Staff
- 21,330

More than
40,000
Students

more than 2,500
International Students
from 74 countries

5,500 Professors and
Associate Professors

5,200 Research Associates

2,660 Doctors of Science

5,680 PhD Degree holders

180 Members and Corresponding
Members of the Russian Academy of
Sciences

130 Members and Corresponding
Members of the Branch Academies

MOSCOW UNIVERSITY – IT IS:

Computer network MSUNet

MSU.RU

7,500 network computers

WWW.MSU.RU

About 1000 sites

MSU.RU

150 km optic fibre connections in Moscow

MSU.RU

Speed - more than 100 Mbit per second

WWW.MSU.RU

Everyday traffic more than 4 Tbit

MSU.RU

**University Web-system
comprises 75 sites of University divisions**

WWW.MSU.RU

WWW.MSU.RU

WWW.MSU.RU

MOSCOW UNIVERSITY – IT IS:

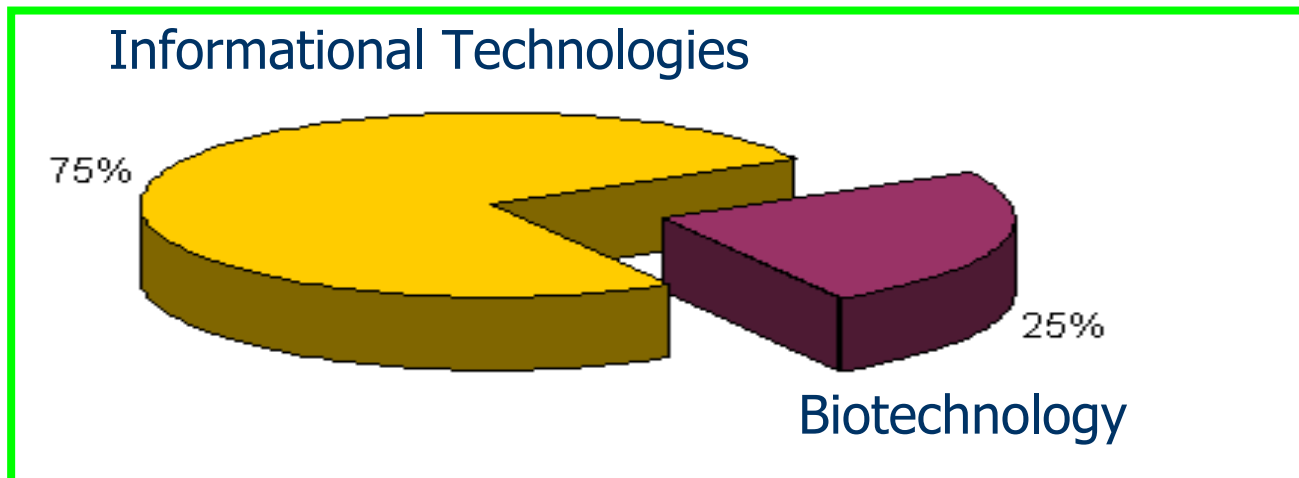
International Cooperation





Moscow University Science Park

- 40 companies (70 % of them are MSU spin-off companies);
- total turnover around \$100 mill.;
- R and D work performed at MSU around \$340 000;
- over 2500 of staff (80 % of them are MSU researchers, post graduates, students and graduates)



Priority Themes:

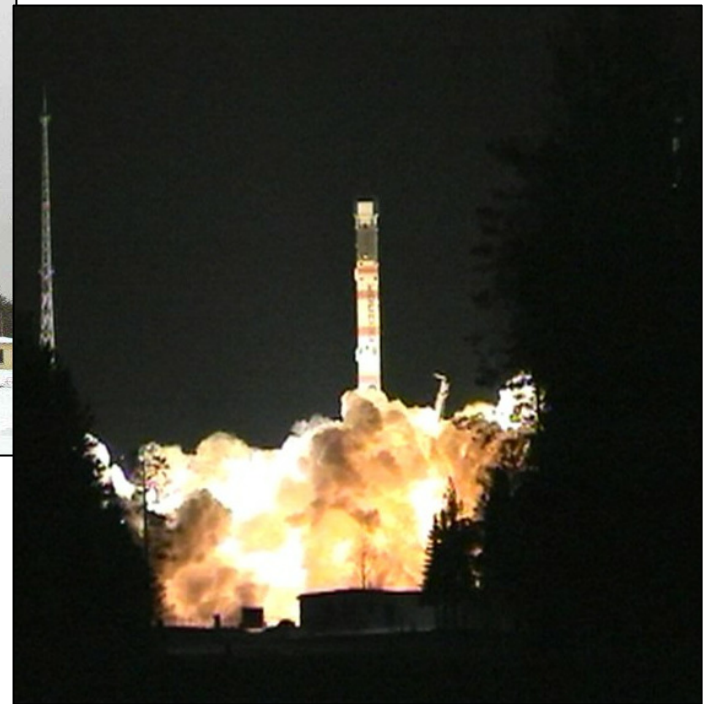
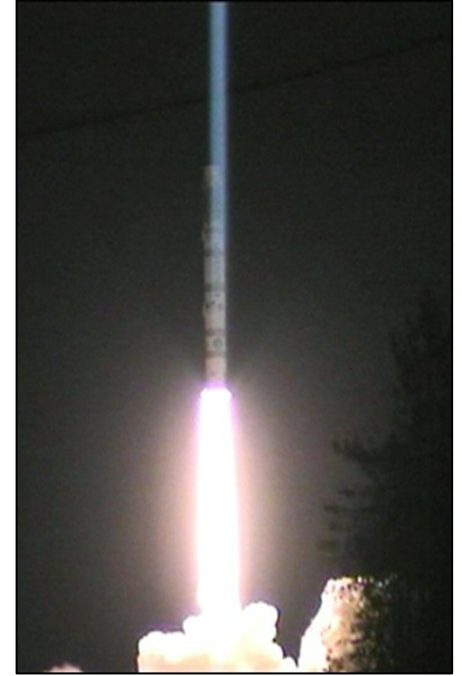
- Nanosciences, nanotechnologies, new materials
- Information and Communication technologies
- Energy
- Environment
- Space Physics
- Astrophysics
- Health
- **Biotechnologies**

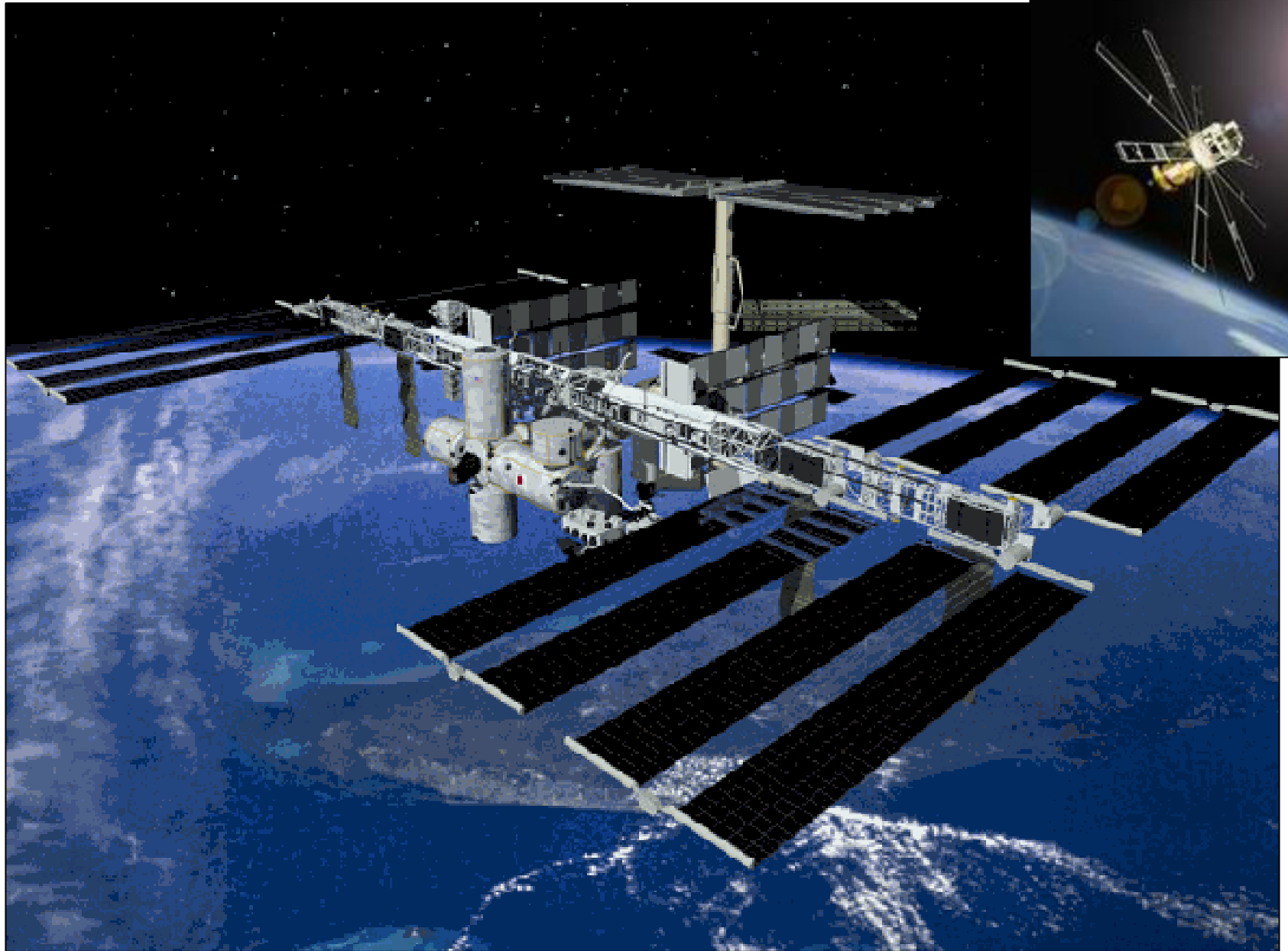


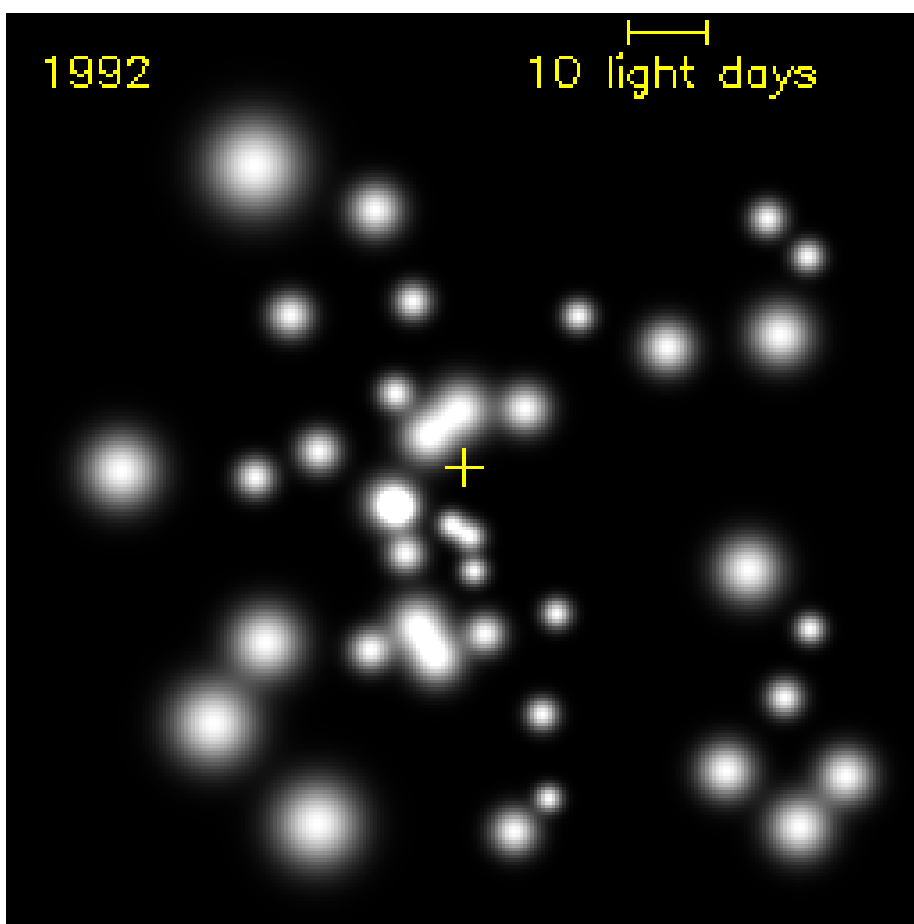


Examples of MSU research activities

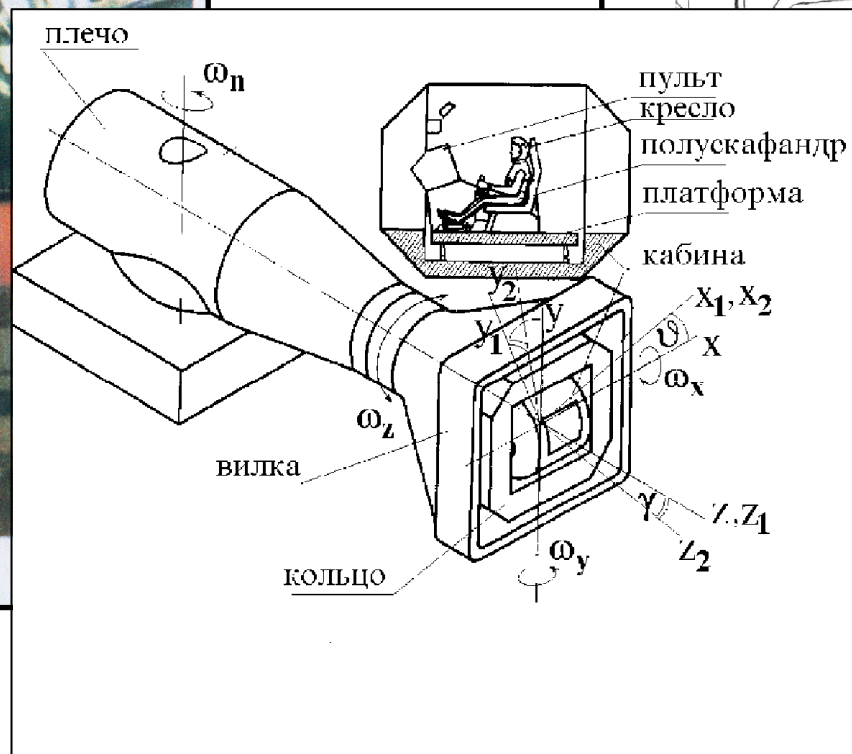
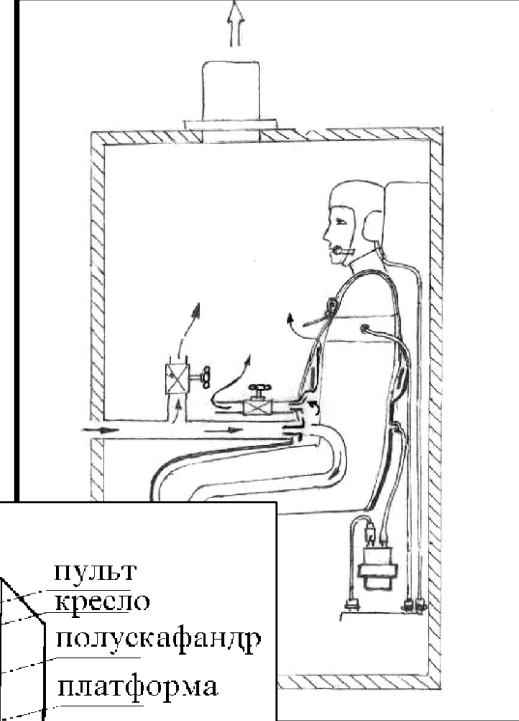
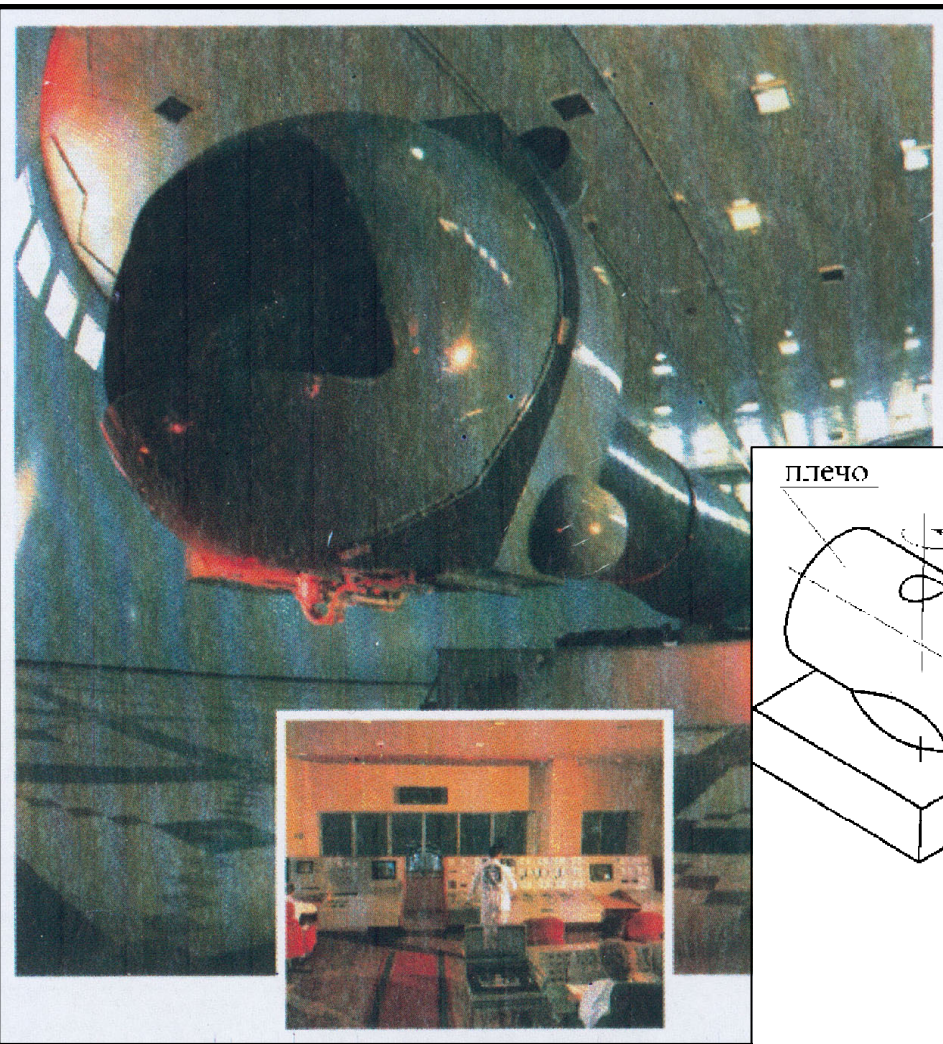








Stellar rotation around an invisible object – a dark hole. MSU “master” robo-telescope is a unique instrument.

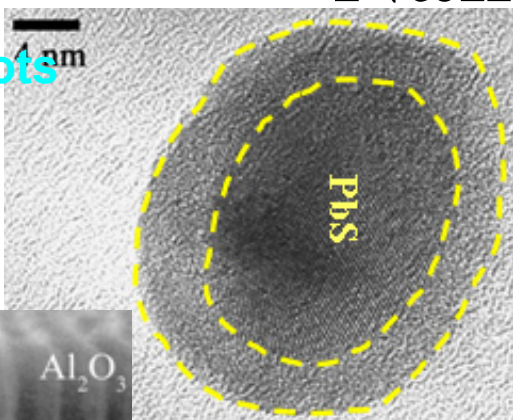


Space-piloting training instrument



Nanomaterials

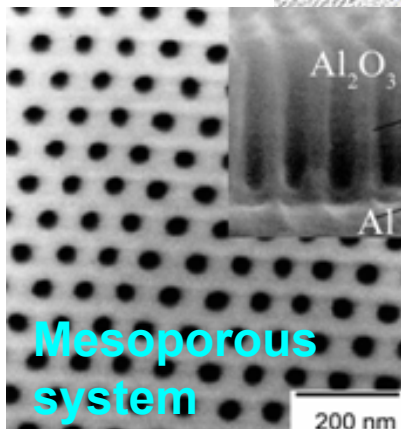
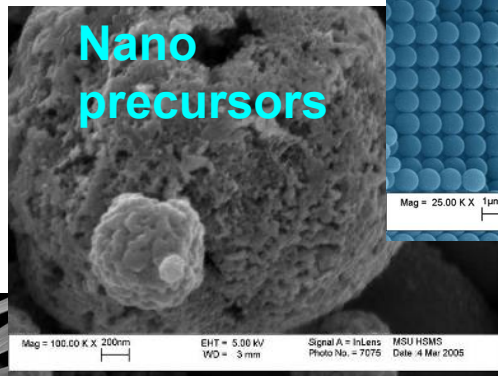
Quantum dots



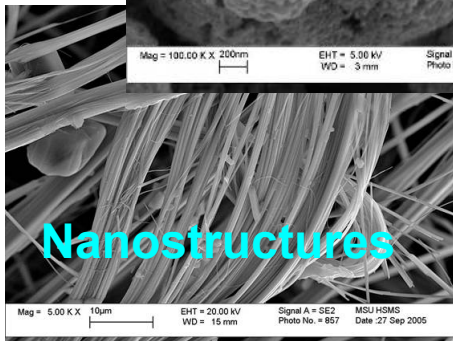
Photon crystals



Nano precursors



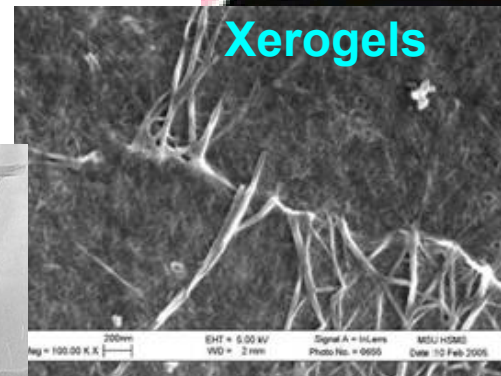
Mesoporous system



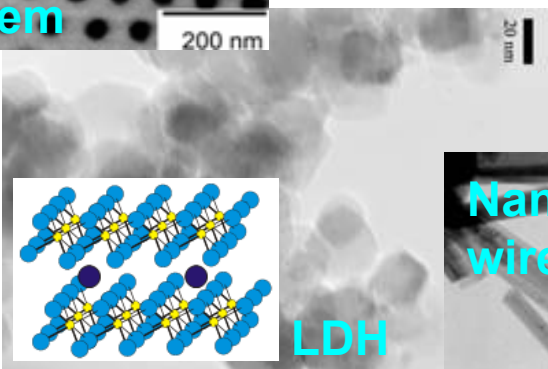
Nanostructures



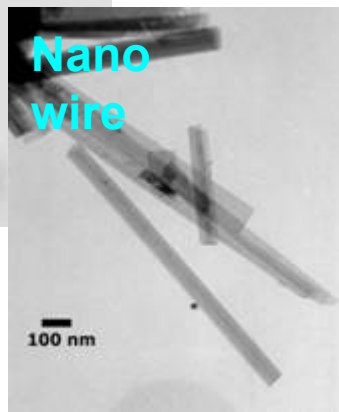
Aerogels



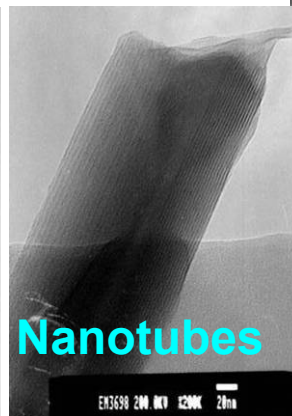
Xerogels



LDH



Nano wire

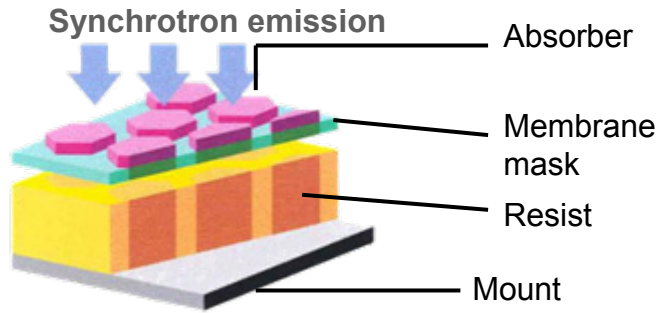


Nanotubes

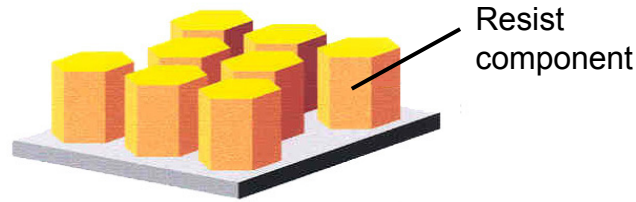


Production of nanomachines (LIGA-Technology)

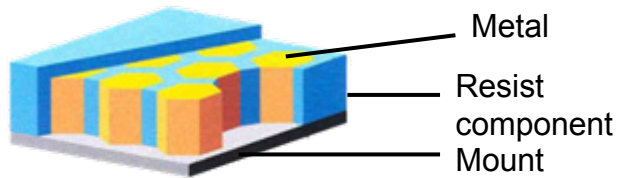
1. Emission



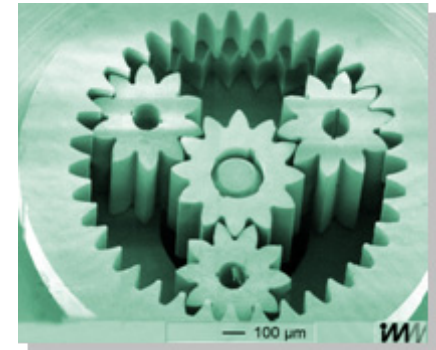
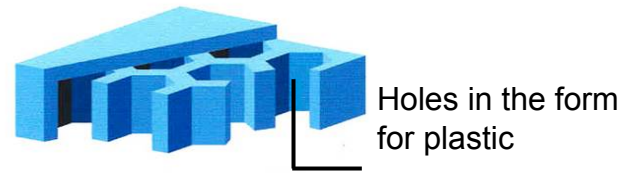
2. Development



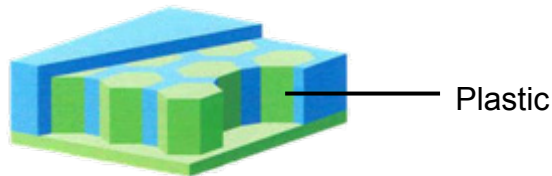
3. Electrodeposition



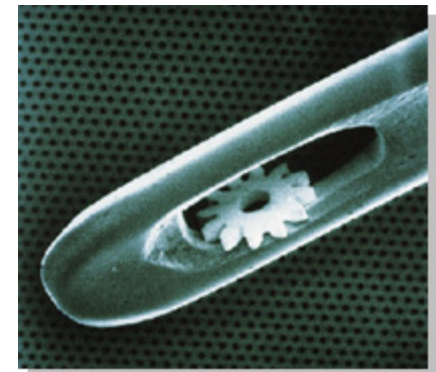
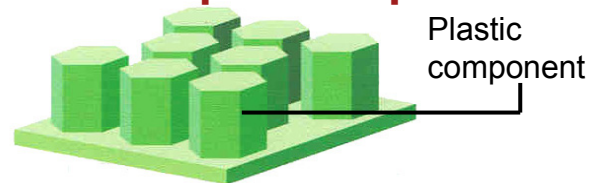
4. Form treatment



5. Moulding



6. Work-piece separation

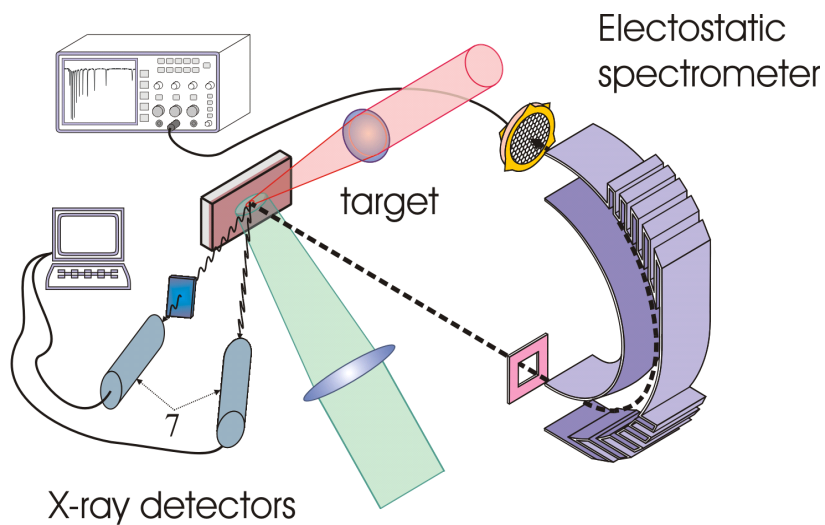




Generation and application of super –power laser light fields

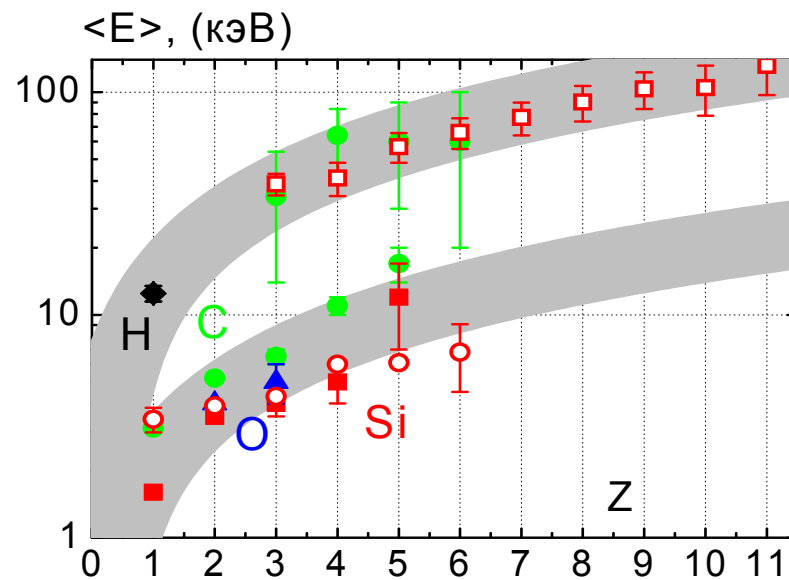
Current studies:

- ✓ Laser induced nuclear reactions
- ✓ Picosecond Roentgen pulses
- ✓ Formation of quick heavy ion and proton beams



Novel directions:

- ✓ Tera-Hz emission
- ✓ Non-linear transformation of sub-tera-Watt femtosecond emission

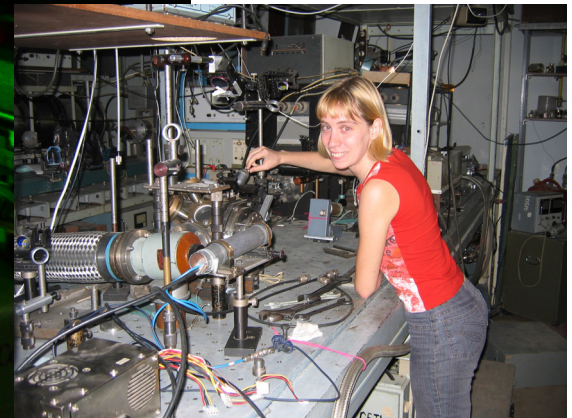
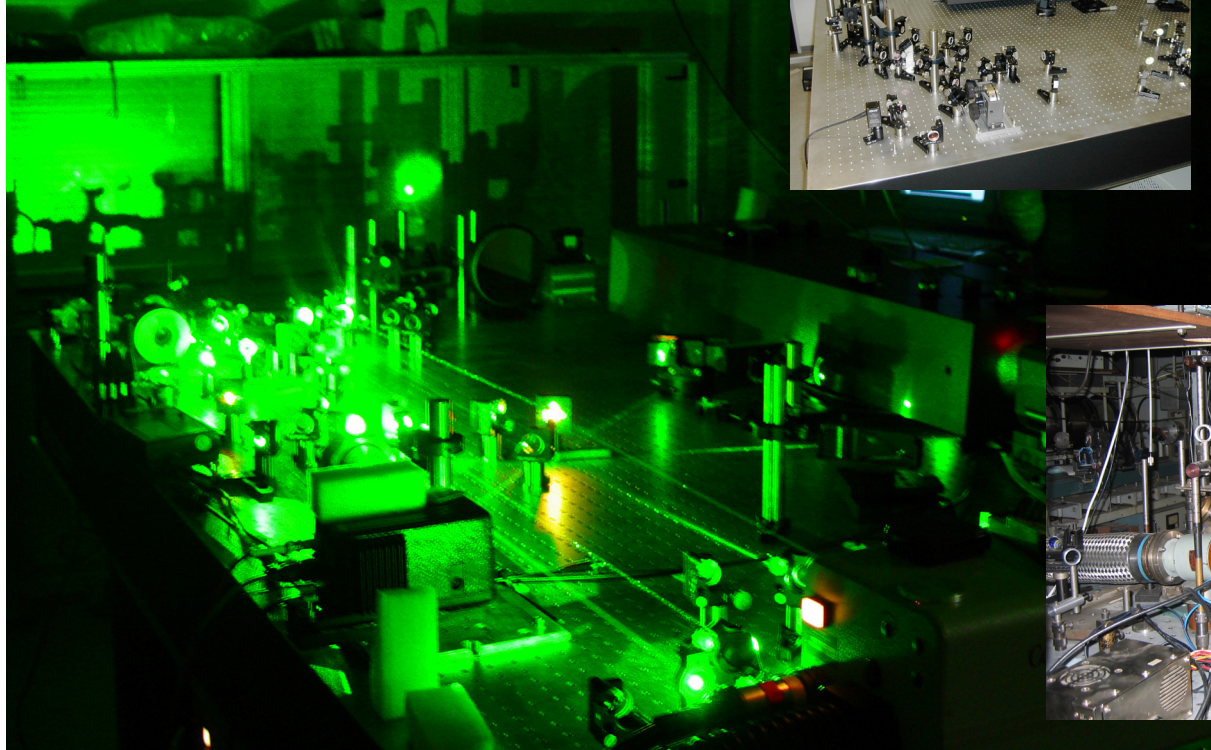
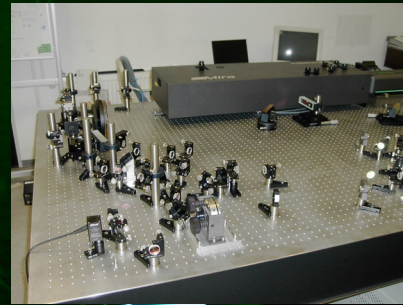
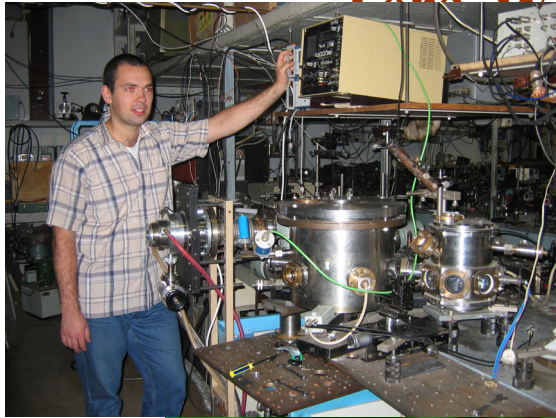




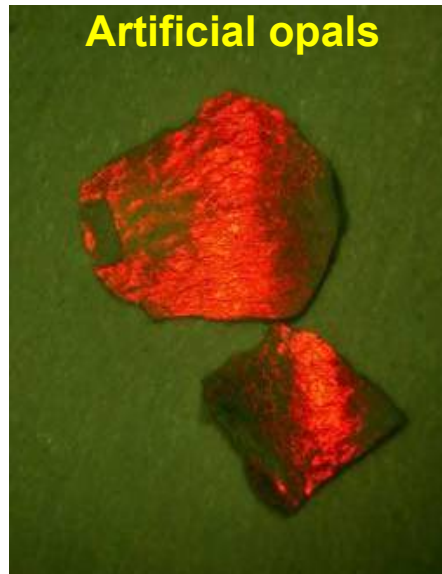
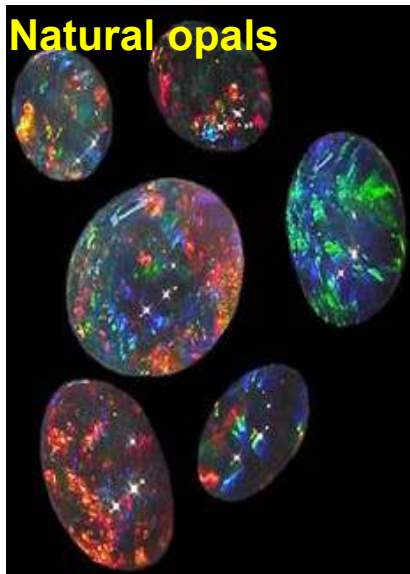
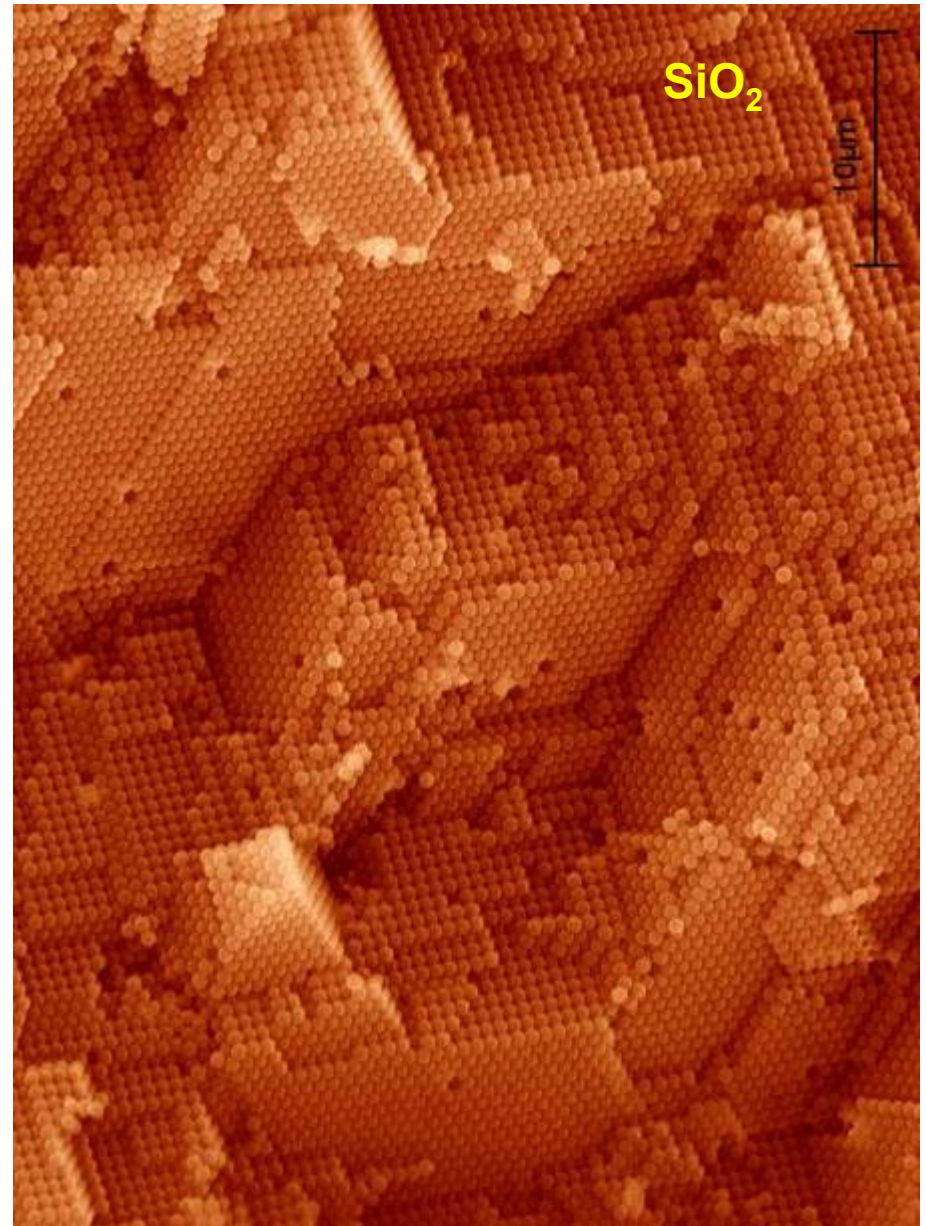
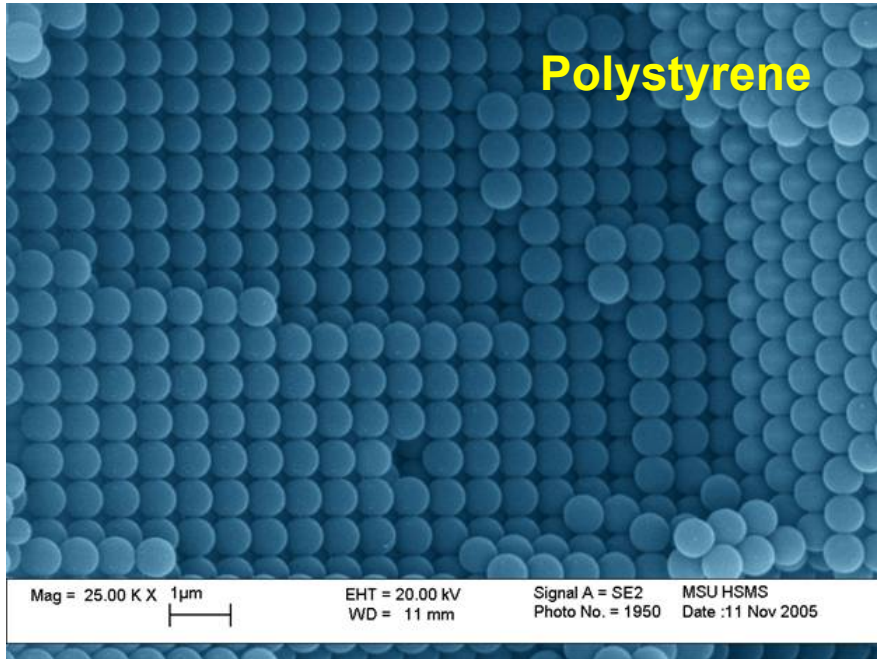
Tens Watt femtosecond laser Ti:Sa system

40 fs, 40 mJ, 10 Hz

$> 10^{18}$ Wt/sm² in focuse



Photon crystals for super fast data-flow optical switches





Department of
Fundamental
Medicine

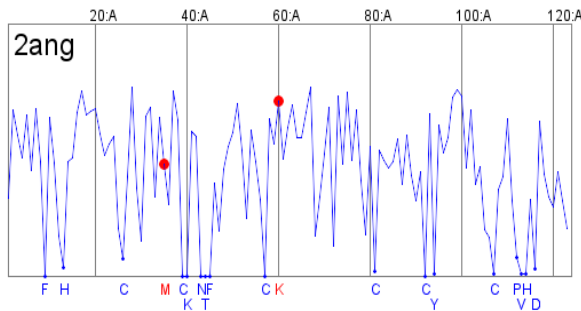
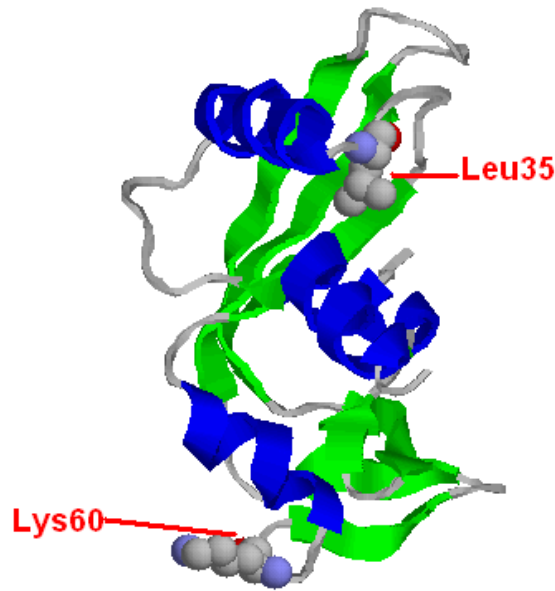
DNA-Technology Ltd

Department of Biology

**Development of equipment and
methods for AIDS diagnostics using
DNA structure (real-time PCR) for
routine use in hospitals and
polyclinics**



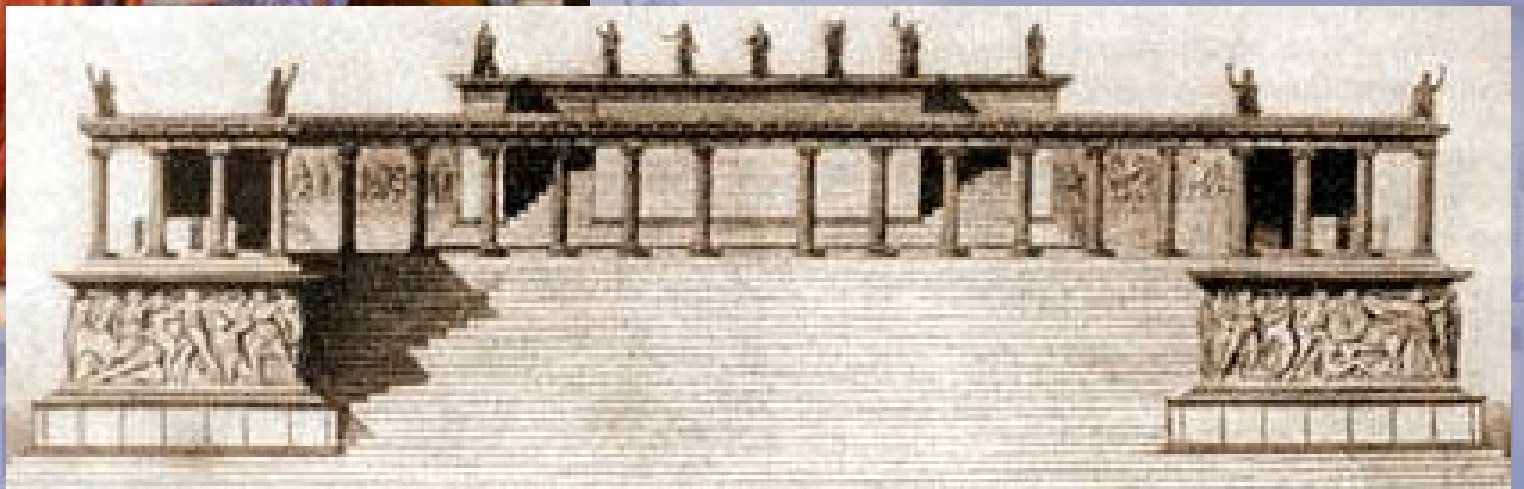
Molecular polymorphysm in humans - individual diversity of biomolecules at gene and protein level. Molecular nature of human individuality

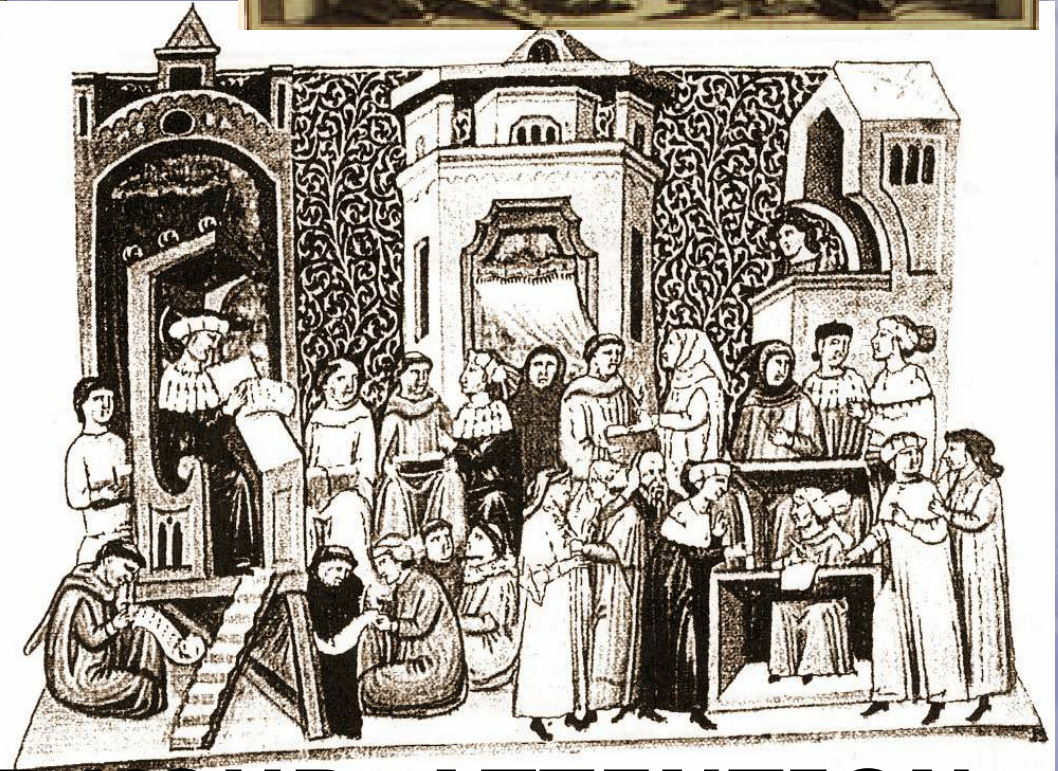


- Medical prediagnostics of cardiovascular and oncology diseases
- Individual sensibility to pharmaceutical substances
- Indubitable personal identification at the molecular level
- Molecular approaches assessment of professional predispositions



Modern analytical instruments





THANK YOU FOR YOUR ATTENTION