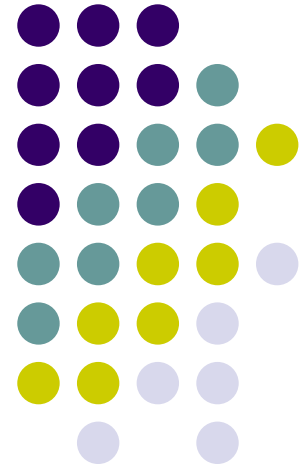


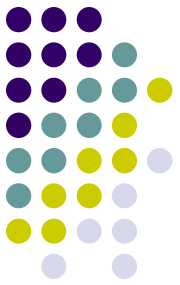
Ingineria Fizica (IF)

la

Facultatea de Stiinte Aplicate (FSA)

- Ce va ofera Facutatea de Stiinte Aplicate in IF ?
- Perspective profesionale dupa absolvire
 - Cercetarea stiintifica Europeana (performanta -doctorat)
 - Laboratoare analize mediu si materiale (firme private si institutii guvernamentale)
 - Firme de optica, laseri, materiale
 - Energetica nucleara, spitale-imagistica si radioizotopi,etc.
 - Invatamant si educatie
- Etape de studiu:
 - Licenta (4 ani) / Master (2 ani)/ Doctorat (3-4 ani)





De ce sa studiatii la FSA?

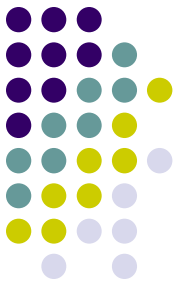
Ce dorim cu programele noastre de la FSA?

- O perspectiva profesionala solida pentru absolventi
- Satisfactie intelectuala profunda - "intelegerea" mecanismele naturii si in acelasi timp dobandirea unor "competente ale concretului"
- Fun !

O intrebare fireasca:

- Ingineria $\equiv$ Stiinta Aplicata prin definitie
atunci ce au diferit programele de Inginerie Fizica, Ingineria Matematica la FSA?

Ce competente veti dobandi in Programul de Inginerie Fizica?



- Generale (absolut necesare!)

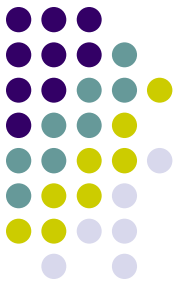
- Mecanica clasica, relativista, cuantica
- Fenomene termice, statistica
- Electromagnetism, optica
- Fizica moleculei, atomului, nucleului, particulelor elementare
- Fizica materiei condensate (cristale, polimeri...)

- De specialitate (dublate de laboratoare in Departamentul de Fizica al UPB & IFA)

- Laseri - procesarea materialelor cu laseri (Lab. procesare M. Stafe)
- Metode holografice (Lab. holografie - M. Mihailescu)
- Corp solid si cristale lichide (Lab. A. Ionescu & E. Petrescu)
- Fotonica (P. Sterian)
- Tehnici de analiza in stiintele mediului si materialelor:
 - optice - microscopie de inalta rezolutie (CMMIP Gh. Stanciu)
 - nucleare - pozitroni, fond redus (LaMAR - Gh. Cata-Danil)

- Doctorate in aceste directii!

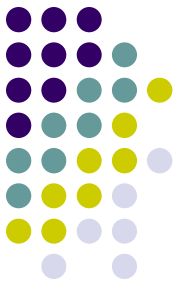
Exemplu de Laborator de cercetare in Departamentul de Fizica
Microscopie de Inalta Rezolutie
(Lab. prof. Gh. Stanciu)



Atomic Force Microscope Quesant Q-Scope 350



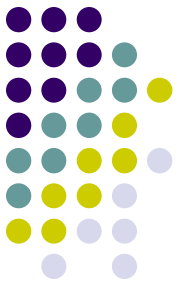
Exemplu de Laborator de cercetare in Departamentul de Fizica
Microscopie de Inalta Rezolutie
(Lab. prof. Gh. Stanciu)



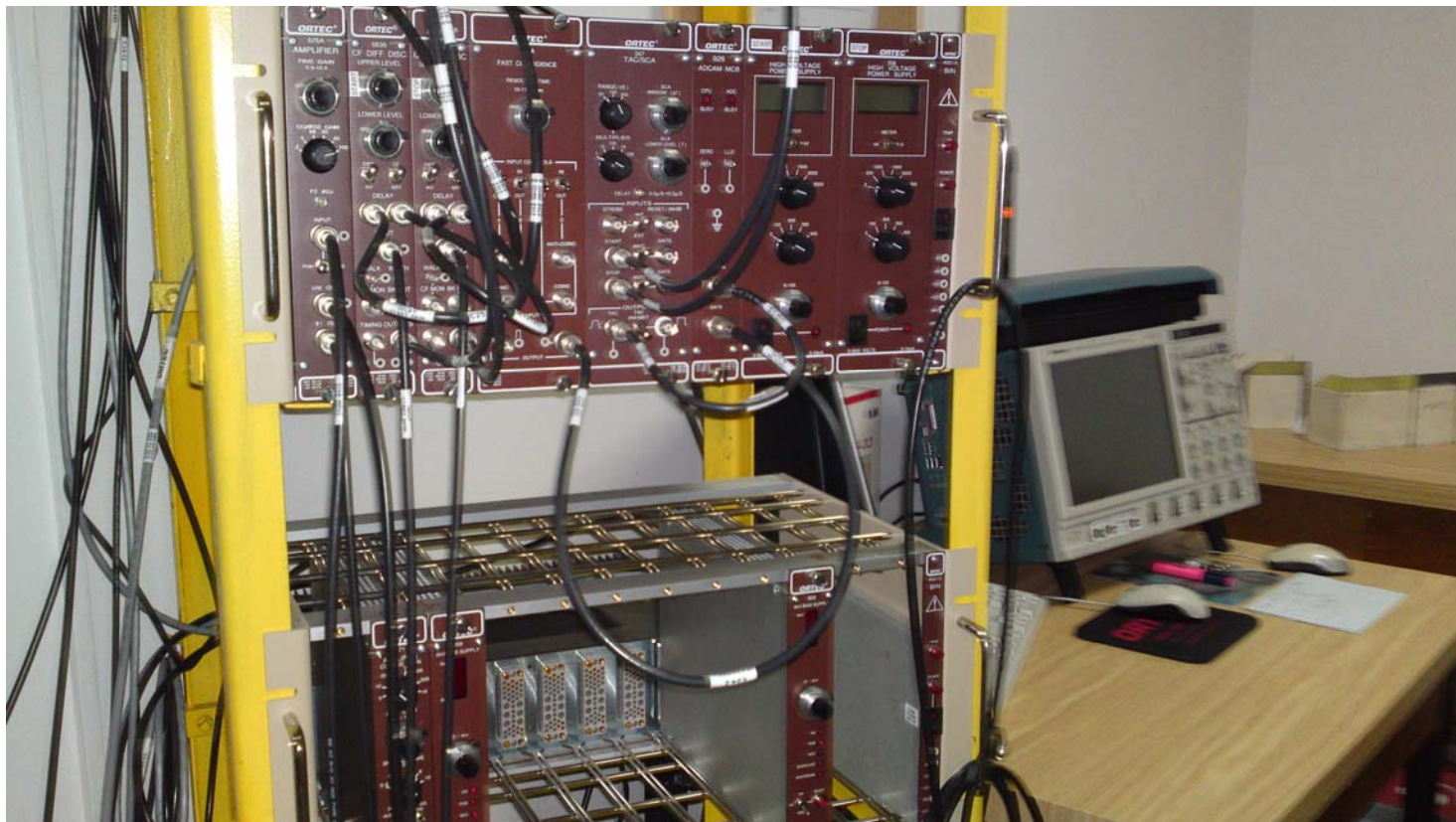
Confocal Laser Scanning Microscope Leica TCS SP



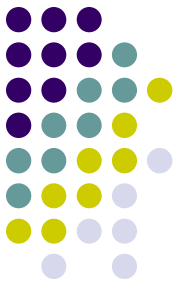
Exemplu de Laborator de cercetare in Departamentul de Fizica **LaMAR (Laborator pentru Masurarea si Utilizarea Radiatiilor ionizante) (Lab. prof. Gh. Cata-Danil)**



Sistem de masura prin anihilare pozitronica



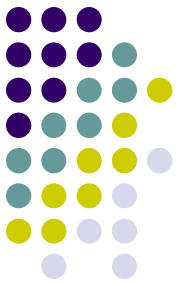
Exemplu de Laborator de cercetare in Departamentul de Fizica
**LaMAR (Laborator pentru Masurarea si Utilizarea
Radiatiilor ionizante) (Lab. prof. Gh. Cata-Danil)**



Detectori de inalta rezolutie cu Germaniu Hiperpur



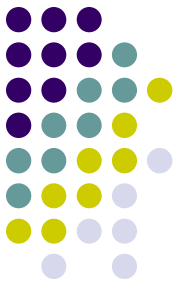
Exemplu de Laborator de cercetare in Departamentul de Fizica **LaMAR (Laborator pentru Masurarea si Utilizarea Radiatiilor ionizante) (Lab. prof. Gh. Cata-Danil)**



Electronica digitala in spectrometria nucleara

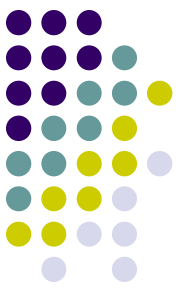


Exemplu de Laborator de cercetare in Departamentul de Fizica
Laborator de Holografie Digitala
(Lab. Sef Lucrari dr. M. Mihailescu)



Laboratorul acceleratorului TANDEM din IFIN-HH

(sef Laborator Dr. Dan GHITA - absolvent de Inginerie Fizica, UPB)



Angajati in prezent:

- 3 doctori absolventi de Inginerie Fizica, UPB
- 2 doctoranzi
- 9 lucrari de diploma
- 5 disertatii
- 12 studenti in practica in fiecare an

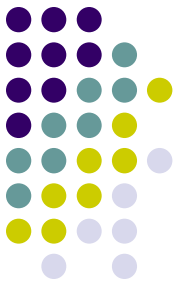
www.tandem.nipne.ro

www.nipne.ro

Extreme Light Infrastructure

(ELI) <http://www.extreme-light-infrastructure.eu/>

contact person: prof. Alexandru Lupascu



- **ELI-Beamlines Facility**

- _ In the **Czech Republic**, Prague, the ELI pillar will focus on providing ultra-short energetic particle (10 GeV) and radiation (up to few MeV) beams produced from compact laser plasma accelerators to users.

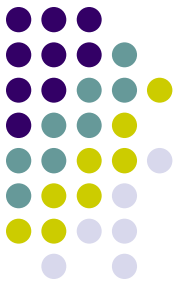
- **ELI-Attosecond Facility**

- _ In **Hungary**, Szeged, the ELI pillar will be dedicated to extremely fast dynamics by taking snap-shots in the attosecond scale (a billion of a billion of second) of the electron dynamics in atoms, molecules, plasmas and solids. It will also pursue research in ultrahigh intensity laser.

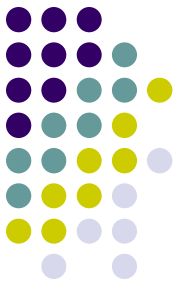
- **ELI-Nuclear Physics Facility**

- _ In **Romania**, Magurele, the ELI pillar will focus on laser-based nuclear physics. For this purpose, an intense gamma-ray source is foreseen by coupling a high-energy particle accelerator to a high-power laser.

Extreme Light Infrastructure (ELI-NP) 280 MEuro 2012-2016



Oportunitati pentru Inginerii Fizicieni
studenti/absolventi



**1PW ~highest
power laser today
(Gemini, Vulcan)**

10^{22} W/cm^2

**The most powerful
installations (100-200TW)
(Commercially available)**

$I < 10^{21} \text{ W/cm}^2$

from G. Mourou

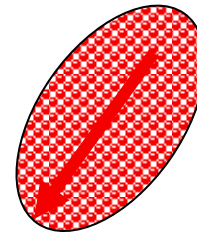
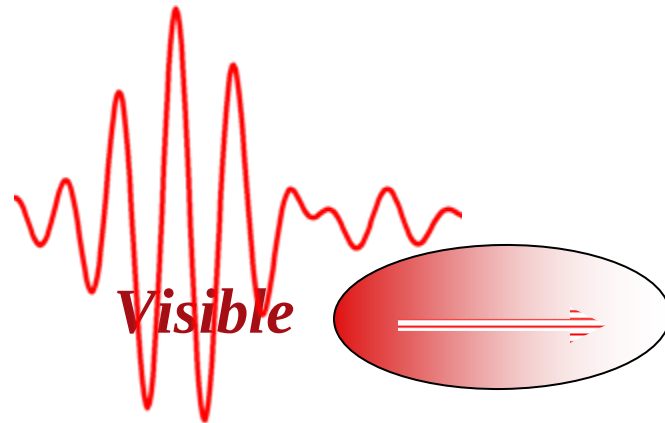
**200PW
ELI
The highest peak
project**

10^{25} W/cm^2

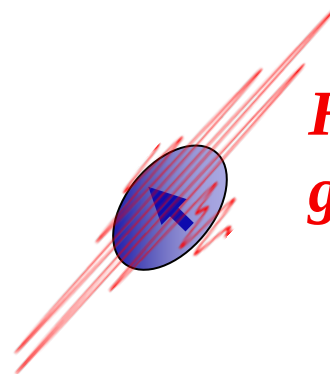
**10PW
Apollon (ILE)**

$10^{23} \text{ } 10^{24} \text{ W/cm}^2$

***Ultrashort pulses can provide
Photons and Particles with Short and Synchronized Time
Structure in the femtosecond, attosecond, zeptosecond
regimes***



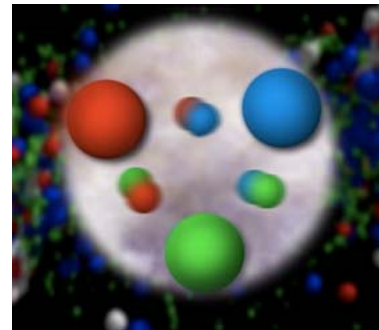
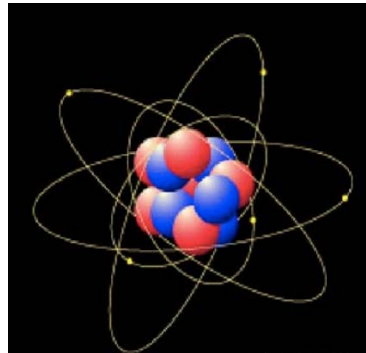
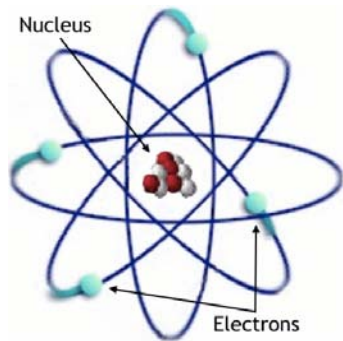
***Particules: Electrons
Protons, muons,...***



***High energy radiation: X,
gamma ray***

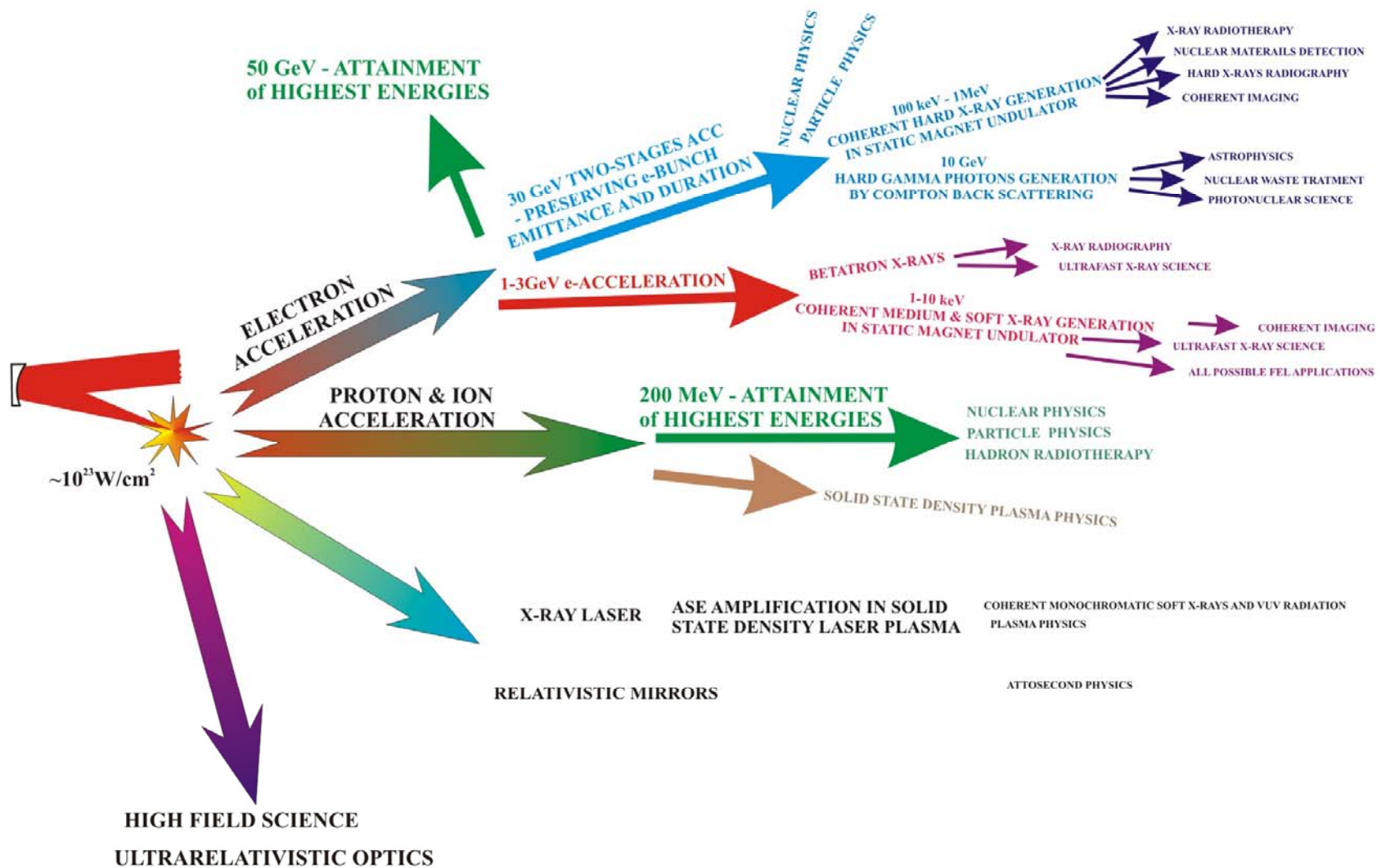


Mission: ***Study matter from atom to vacuum***



from G. Mourou

Oportunitati pentru Inginerii Fizicieni studenti/absolventi



from G. Mourou



eli Courier

www.eli-laser.eu

Volume 1 No 1 September 2009

ISSN 2041-9023

News from the Extreme Light Infrastructure European project

Site choice: an ongoing process

Focus on Romania and Hungary



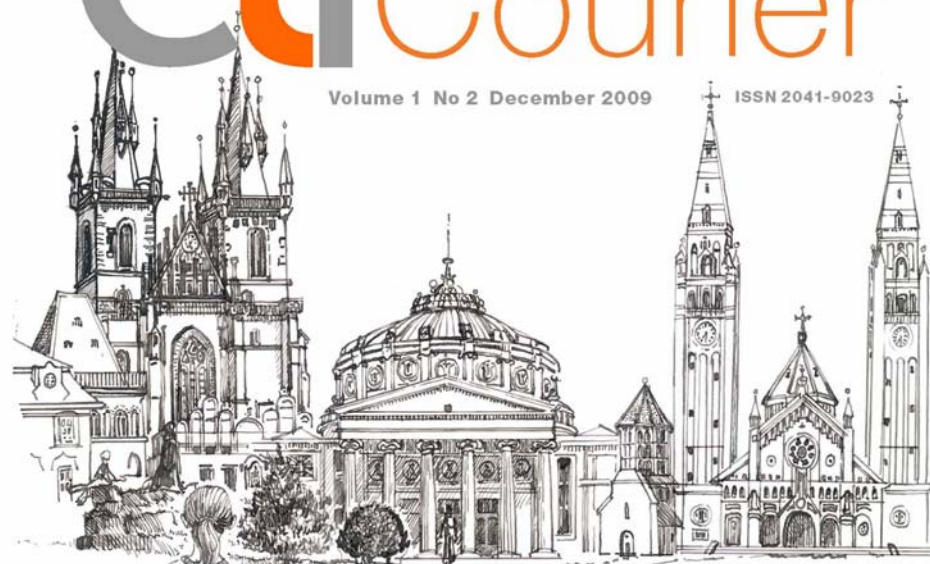
eli Courier

www.eli-laser.eu

News from the Extreme Light Infrastructure European project

Volume 1 No 2 December 2009

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ELI's grand challenges

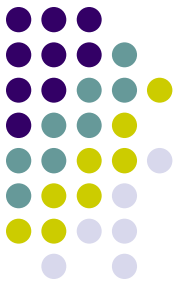
Focus on Greece and Spain

"Go east young men!"



Extreme Light Infrastructure (ELI-NP)

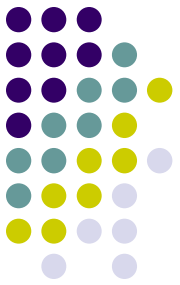
huge opportunity for the FSA-IF students



- Ingineria Fizica le ofera educatia "optima" pentru studii/joburi la ELI-NP
- Acces direct - cadrele didactice din FSA sunt direct implicate in constructia ELI-NP (e.g. Gh. Cata-Danil este director adjunct - vezi www.eli-np.ro)
- Favorabil in timp - constructia se termina (incep angajari) in momentul in care studentii din anul I termina ciclul de licenta!

Centrul European de Cercetari Nucleare (CERN)

contact person: prof. Gh. Cata-Danil (cata-danil@physics.pub.ro)
vezi www.cern.ch



Romania - tara membra (plateste cotizatie) - oportunitati de joburi/studii

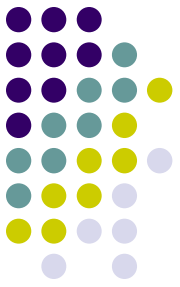
- experimentele ALICE/ATLAS/LHCB - direct implicate grupuri de cercetare romanesti (detectori construiti in Romania) - e.g. **sefa de promotie de IF 2011!**
- **How the web began:**

The first proposal for the World Wide Web (WWW) was made at CERN by Tim Berners-Lee in 1989, and further refined.
- **Large Hadron Collider (LHC): "extreme machine"**
 - The largest machine in the world...
 - The fastest racetrack on the planet... (99.9999991% the speed of light)
 - The emptiest space in the Solar System...(vacuum: 10^{-13} atm)
 - The hottest spots in the galaxy, but even colder than outer space...
 - The biggest and most sophisticated detectors ever built...
 - The most powerful supercomputer system in the world...

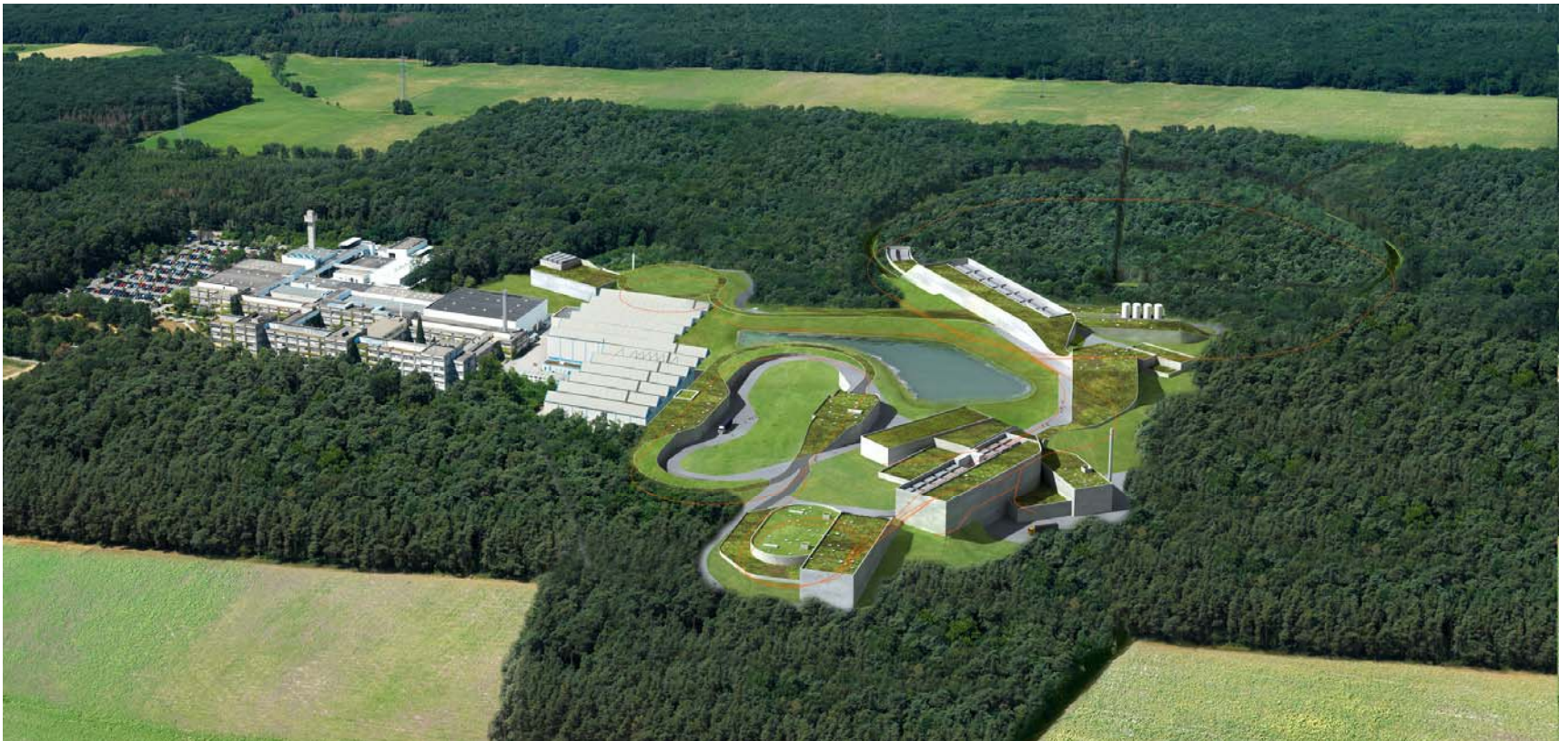
FAIR (Facility for Antiproton and Ion Research) - Germania

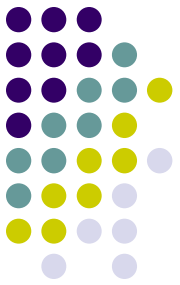
contact person: Sef Lucrari dr. Eugen Scarlat

<http://www.gsi.de/fair/>



- Romania - TARA FONDATOARE - oportunitati de studii/joburi IF





In loc de Concluzii...

- Studentii la Inginerie Fizica au oportunitati URIASE pentru profesii the High Tech la marile instalatii de cercetare Europene si Romanesti
- ...dar cu efort si pasiune in studiul disciplinelor din planurile de studiu

Mult succes!