

***“European Nuclear Science  
and Applications Research”  
(ENSAR)***

**Muhsin N. Harakeh**  
**Coordinator ENSAR**

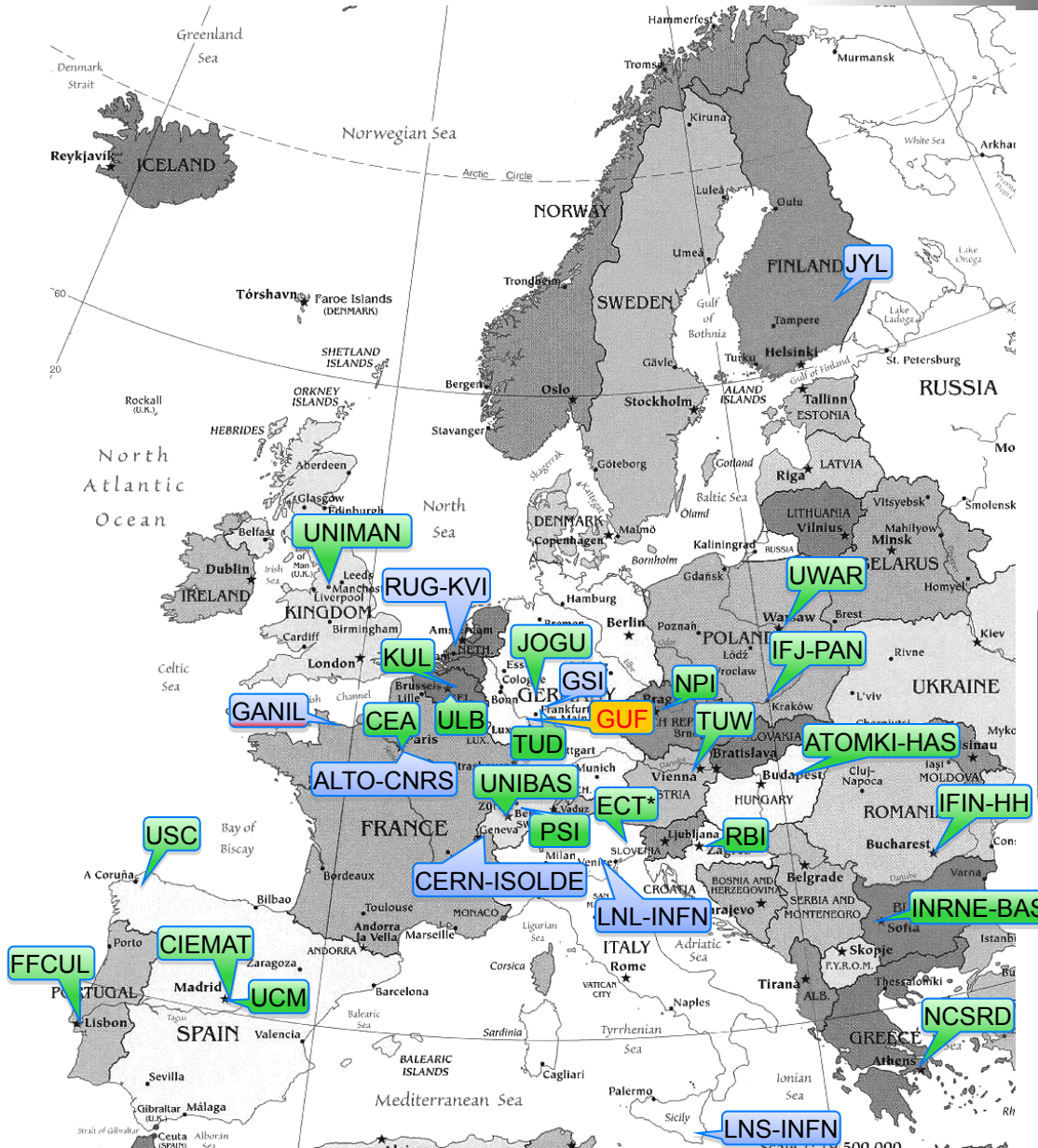
***on behalf of the ENSAR management  
group (FISCO)***

**FCG Meeting**

**12 October 2012**

**Schiphol, Amsterdam, the Netherlands**

# Partners of ENSAR



**7 TNA Facilities**

**30 beneficiaries**

**53 associated partners**  
**18 countries**

**EC financial  
contribution: 8 M€**

## Transnational Access Facilities in **IA ENSAR**

- TNA1 (Access to *GANIL*, **3510 hours of beam**)
- TNA2 (Access to *GSI*, **3750 h**)
- TNA3 (Access to *INFN-LNL&LNS*, **4424 h**)
- TNA4 (Access to *JYU-JYFL*, **3000h**)
- TNA5 (Access to *KVI*, **800 h**)
- TNA6 (Access to *CERN-ISOLDE*, **5200 h**)
- TNA7 (Access to *ALTO*, **1470 h**)

Strong emphasis on the support for users (30-40% of the TNA EC request)

## Network Activities in ENSAR (2<sup>nd</sup> Call)

- NA01 **FISCO** (*FI*nancial & *SC*ientific *CO*ordination) *M. N. Harakeh*
- NA02 **ECOS** (*EU*ropean *CO*llaboration *ON* *Stable ion beams*) *F. Azaiez*
- NA03 **EURISOL NET** (*EU*ropean *ISOL NET*work) *Y. Blumenfeld*
- NA04 **ATHENA** (*Ad*vanced *TH*eory & *EX*periments for *Nuclear Astrophysics*) *K. Sonnabend*
- NA05 **EGAN** (*EU*ropean *Gamma & Ancillary detectors Network*) *S. Lenzi*
- NA06 **EFINION** (*EU*ropean *FOR*um for *Innovative applications of Nuclear ION beams and tools*) *S. Harissopulos*

# Joint Research Activities in ENSAR (2<sup>nd</sup> Call) ENSAR

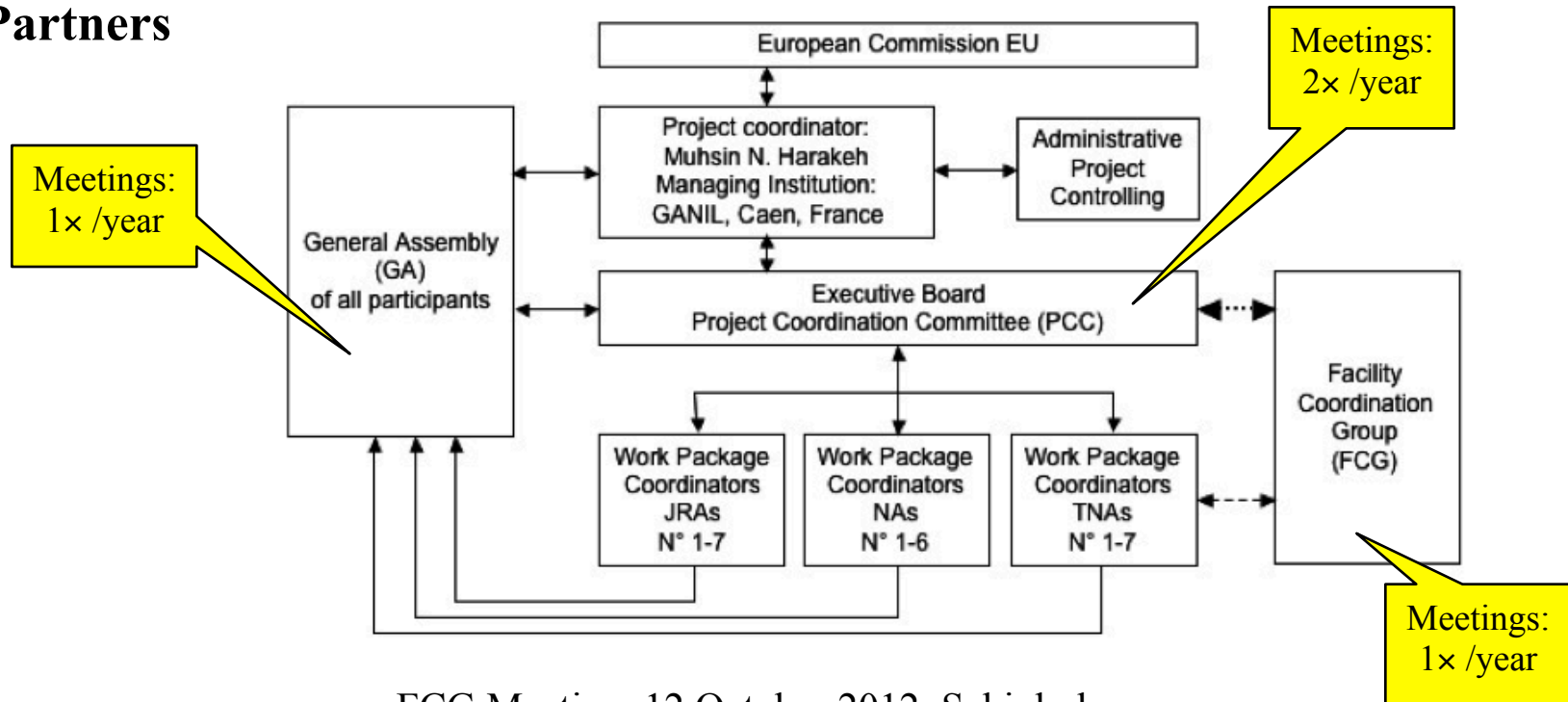
The JRAs deal with all aspects of experimental activities from sources and targets, to detectors, to simulations of experimental set-ups, data analysis and a development of adequate theoretical tools.

- JRA01 **ARES** (*Advanced Research on Ecr ion Sources*) G. Ciavola
- JRA02 **ActILab** (*Actinide ISOL target R&D Laboratory*) T. Stora
- JRA03 **PREMAS** (*Low-energy beam PREparation, MANipulation & Spectroscopy*) A. Jokinen
- JRA04 **INDESYS** (*INnovative solutions for nuclear physics DETector SYStems: “From basic R&D to applications for the society”*) D. Cortina Gil
- JRA05 **SiNuRSE** (*Simulations for Nuclear Reactions and Structure in Europe*) N. Kalantar-Nayestanaki
- JRA06 **EWIRA** (*East West Integrated Research Activities*) D. Balabanski
  - Create a niche for the small(er) laboratories from Central and South-Eastern Europe and bring them to a level comparable to that of the existing Western European laboratories
- JRA07 **THEXO** (*THEoretical tools in support of infrastructures*)

# ENSAR Organisation

- **Coordinator: M. N. Harakeh** (KVI/GANIL)
- **Deputy Coordinator: M. Lewitowicz** (GANIL)
- **Project Manager: K. Turzó** (GANIL)
- **Financial/administrative: V. Vandevoorde/S. Dubromel**
- **Managing institution: GANIL**
- **30 Partners**

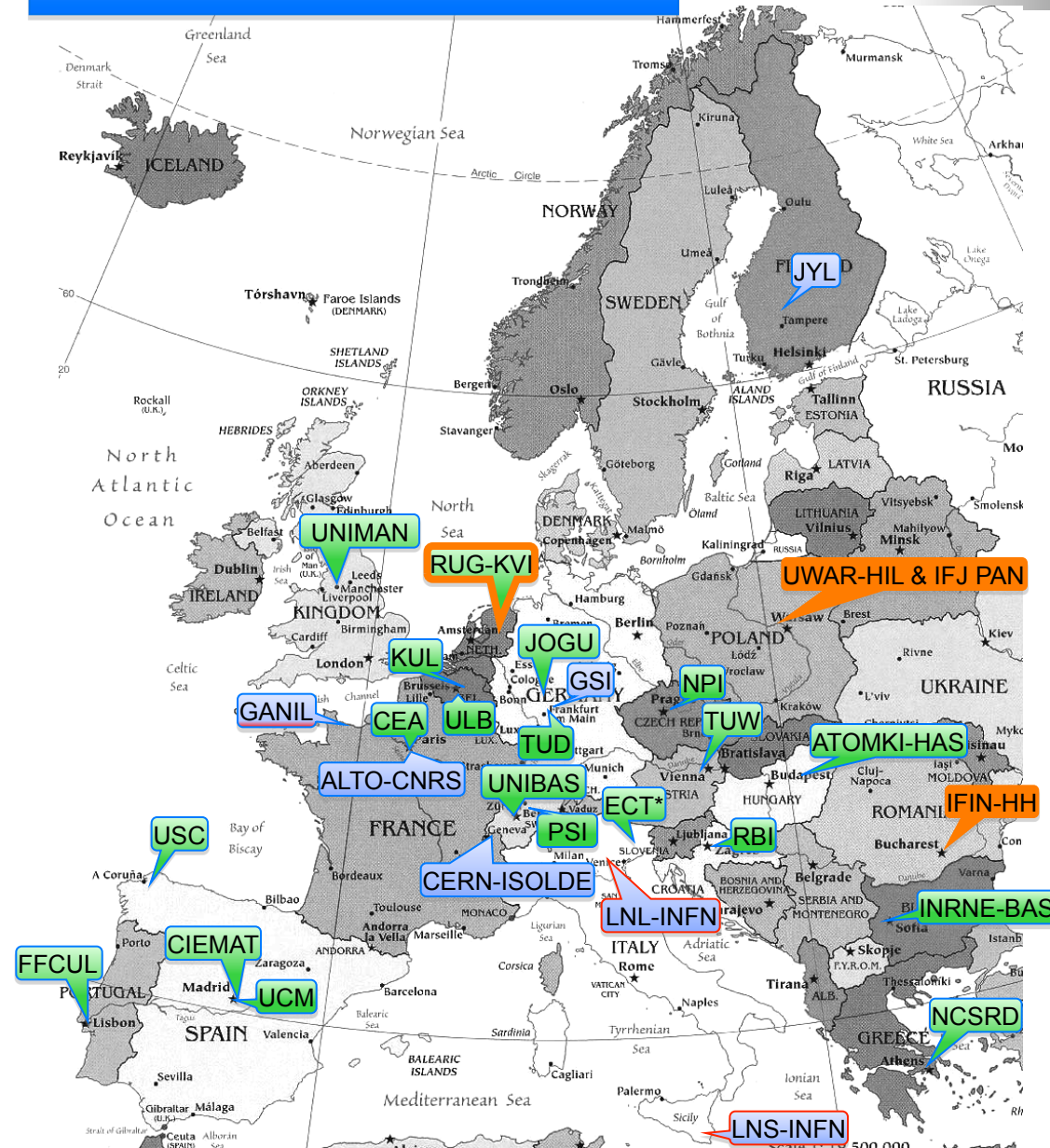
**NA01  
FISCO**





## **The ENSAR 2 proposal aims at:**

- **Supporting the access costs to the research infrastructures at the highest possible level and >> than the few % of real operational costs today**
- **Supporting the scientists, especially the young researchers, participating in experiments at these infrastructures**
- **Supporting the novel instrumentation and theory developments leading to strong improvements of the research infrastructures through Joint Research Activities**
- **Supporting the synergy of the community and promoting and facilitating the use of the research infrastructures through Networking Activities**



**7  $\Rightarrow$  8 TNA Facilities**

**30  $\Rightarrow$  40 beneficiaries**  
 **$\geq$  18 countries**

**Community: 2700-3000**  
**scientists and highly qualified**  
**engineers**

**Close collaboration with**  
**infrastructures outside**  
**Europe:**

**Japan: RIKEN**

**China: IMP Lanzhou**

**United States: NSCL**

**Canada: TRIUMF**



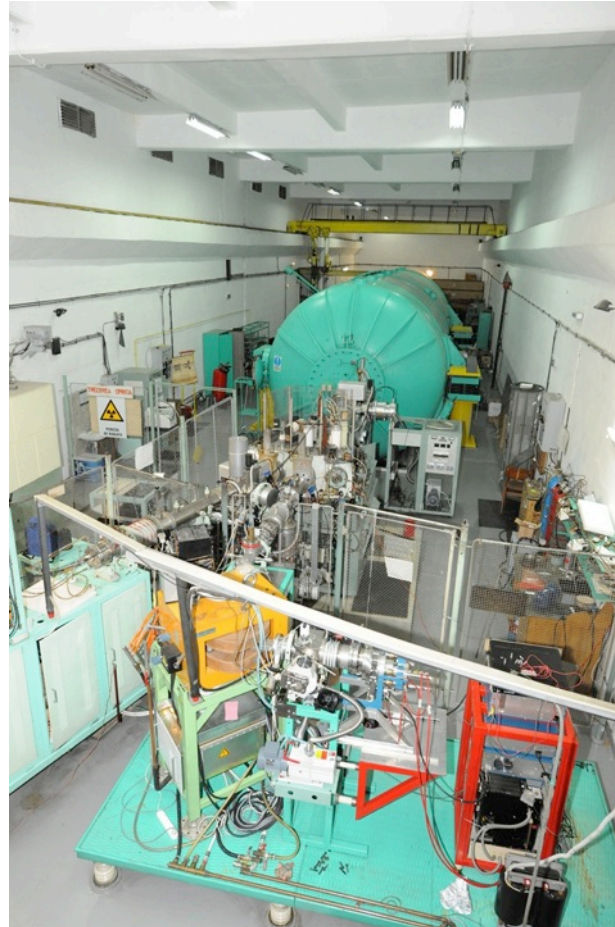
# TANDEM Accelerator at IFIN-HH

European Nuclear Science and Applications Research

ENSAR

- ◆ 9 MV TANDEM accelerator, completely modernised
- ◆ Duoplasmatron alpha particles source (Li-exchange)
- ◆ Sputtering source
- ◆ “Fast” (nanoseconds) pulsing system
- ◆ “Slow” (>millisecond) pulsing system
- ◆ Very good transmission (>98%)

5000 hours of beam time per year

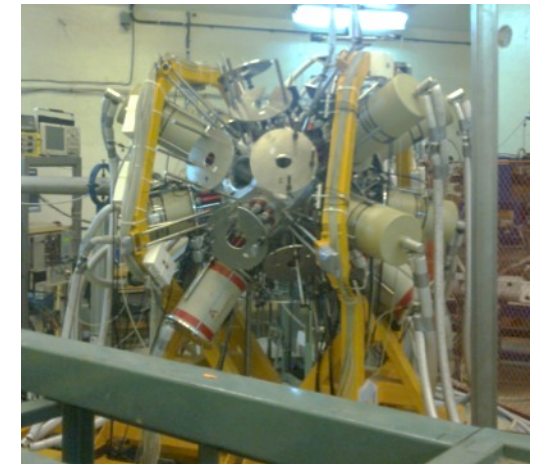


Permanent gamma detection array

25 positions:

55% HPGe detectors

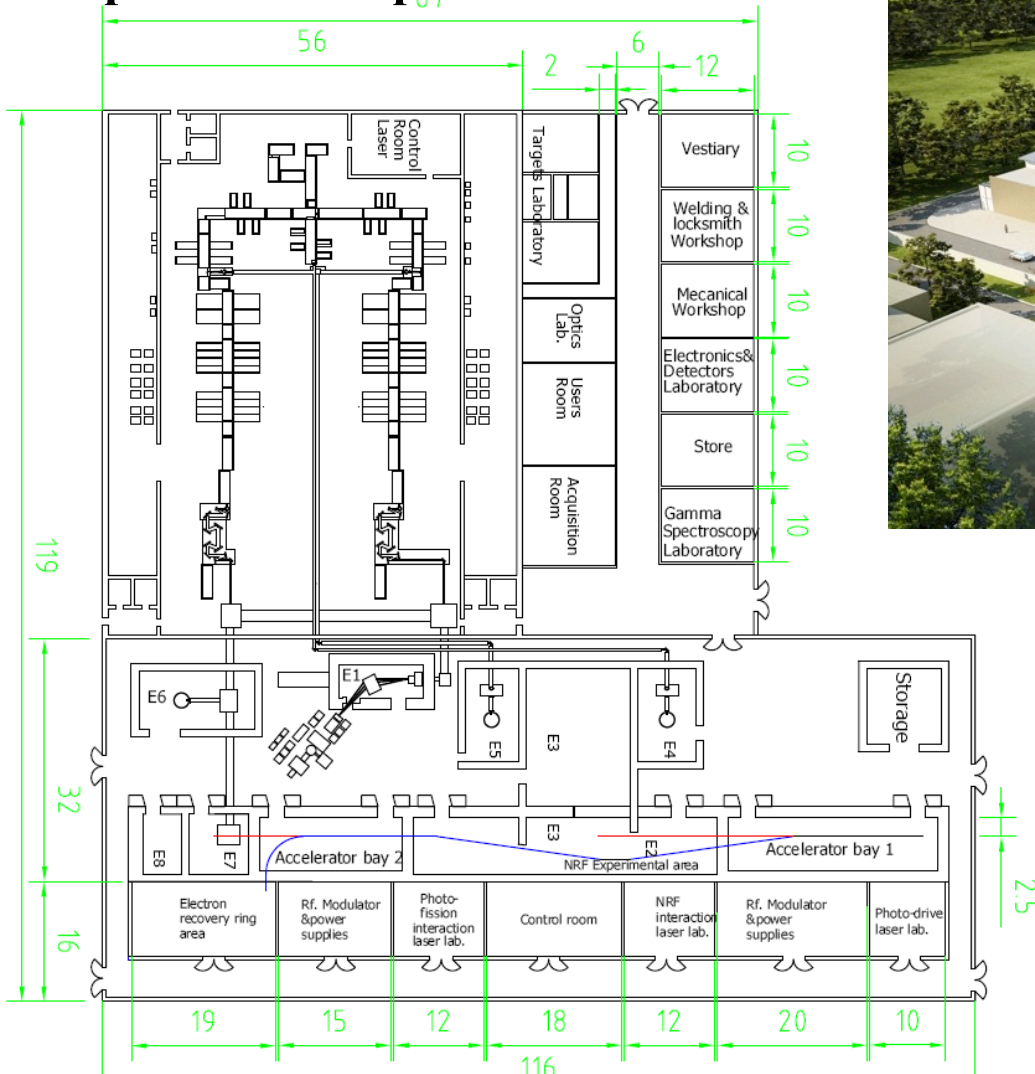
LaBr<sub>3</sub>:Ce detectors



# Possible layout of the ELI-NP facility at Magurele/Bucharest, Romania

Implementation: 2012-2017

<http://www.eli-np.ro>



**ELI-NP:**

- **two lasers of :**

**150 J /15 fs (10 PW)/0.01 Hz**

- **a brilliant gamma beam obtained through backscattering of a 10 J/2 ps / 120 Hz x 100 laser on classical electron bunches from a linac**

· 2012; Schiphol



**NLC: NARODOWE LABORATORIUM  
CYKLOTRONOWE  
(NATIONAL CYCLOTRON LABORATORY),  
WARSAW-KRAKOW, POLAND**

**A consortium of 2 institutions:**

- **HIL: Heavy Ion Laboratory, Warsaw University, Warsaw, Poland**
- **IFJ PAN: Niewodniczanski Institute of Nuclear Physics, Polish Academy of Sciences, Krakow, Poland**

## NLC

**2-centers, 4 cyclotrons for basic research and medical applications; Common Steering Council and Scientific Advisory Board; Separate administrations, International Users Boards or Program Advisory Committees.**

## Cyclotrons

- **U-200 (K=160) heavy-ion cyclotron with energies up to 10 MeV/A at HIL Warsaw;**
- **High intensity proton/deuteron cyclotron (16/8 MeV) for the production of - and research on the radiopharmaceuticals at HIL Warsaw;**
- **AIC-144 isochronous cyclotron with protons (up to 60 MeV), deuterons and He ions (up to 30 MeV) beams at IFJ PAN Kraków;**
- **IBA Proteus-235 cyclotron for protons 70-230 MeV at IFJ PAN Kraków (commissioning end of 2012).**



# Major installations, instruments and services provided to researchers by NLC

## HIL Warsaw

GDR multi-detector system JANOSIK

12 HPGe g-ray multi-detector system EAGLE  
(+20 detectors from Gamma-Pool)

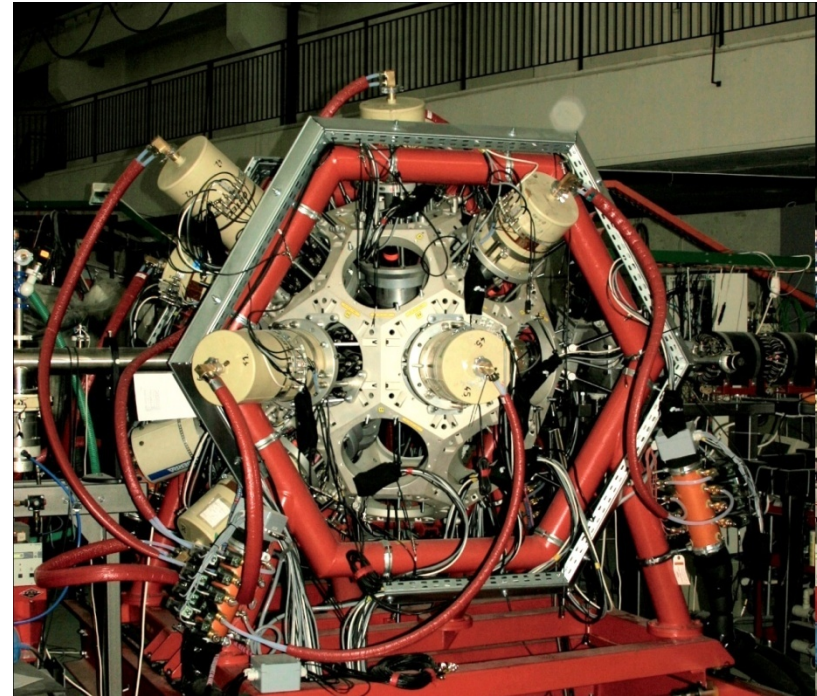
Universal scattering chambers CUDAC

Charged particle multidetector system

ICARE Scandinavian type on-line mass  
separator IGISOL

Irradiation chambers with target water  
cooling

Low-background lead-shielded HPGe  
counters Target laboratory, mechanical and  
electronic workshops, library, two conference  
rooms (120 and 80 participants), 12 guest  
rooms





# Major installations, instruments and services provided to researchers by NLC

## IFJ PAN Kraków

Detector BINA for light ion reactions (from KVI Groningen)

**HECTOR** array for high-energy gamma-rays (from INFN Milano)

Proton therapy room with optical line for beam formation and control, patient positioning system including two X-rays machines and chair for patient positioning

**Isotope production facility with radiochemistry laboratory**

**4 conference rooms (40-150 participants), library, guesthouse with 10 double rooms**



*Installation of the Proteus-235 cyclotron at IFJ PAN*

*Contact: Adam.Maj@ifj.edu.pl*

# **ENSAR 2 New Ideas (preliminary)**

## **Networks**

- **A network on small-scale accelerator facilities**
- **A network on nuclear medicine**
- **A special emphasis is foreseen in the large networking done by theory and their computer facilities**

## **Joint Research Activities:**

- **JRA on nuclear astrophysics**
- **Networking and Joint Research activities are connected to current projects selected by the ERANET-NuPNET: GANAS, NEDENSAA, and FATIMA (R&D on detectors), EMILIE (EURISOL technologies) and SARFEN (nuclear theory)**

# ENSAR 2 EC Request

- **EC financial contribution request:  $\geq 15$  M€**
  - **Transnational Access Activities: 50%**
  - **Networking Activities: 15%**
  - **Joint Research Activities: 35%**

# ENSAR & ENSAR 2

- **ENSAR started on Sept. 1, 2010**
- **End of the ENSAR project August 31, 2014**
- **Pre-proposal for ENSAR 2 as response on the EC consultation by October 2012 (essentially ready)**
- **ENSAR 2 proposal to be prepared by 2013/2014 and submitted as soon as EU FP8 call appears**

**We ask the community to help in the preparation of the ENSAR 2 proposal (in particular suggestions for NAs and JRAs).**

*Thank you for your attention*