Status of the EU-FP7 funded Integrating Activity “European Nuclear Science and Applications Research” (ENSAR) and prospects for FP8 ENSAR 2

Marek Lewitowicz (GANIL)

on behalf of Muhsin Harakeh (ENSAR Coordinator) and
the ENSAR management group (FISCO)
Partners of ENSAR

- 7 TNA Facilities
- 30 beneficiaries
- 18 countries
- 53 associated partners
- 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

• **NA01 FISCO** (FInancial & Scientific COordination)

• **NA02 ECOS** (European Collaboration On Stable ion beams)

• **NA03 EURISOL NET** (EURogeran ISOL NETwork)

• **NA04 ATHENA** (Advanced THeory & Experiments for Nuclear Astrophysics)

• **NA05 EGAN** (European Gamma & Ancillary detectors Network)

• **NA06 EFINION** (European Forum for Innovative applications of Nuclear ION beams and tools)
Joint Research Activities in ENSAR

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

• **JRA01 ARES** *(Advanced Research on Ecr ion Sources)*
• **JRA02 ActILab** *(Actinide ISOL target R&D Laboratory)*
• **JRA03 PREMAS** *(Low-energy beam PREparation, MAnipulation & Spectroscopy)*
• **JRA04 INDESYS** *(INnovative solutions for nuclear physics DETector SYStems: “From basic R&D to applications for the society”)*
• **JRA05 SiNuRSE** *(Simulations for Nuclear Reactions and Structure in Europe)*
• **JRA06 EWIRA** *(East West Integrated Research Activities)*
  • 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** *(TTheoretical 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
- 29 Partners

Meetings:
- General Assembly (GA) of all participants: 1×/year
- Executive Board Project Coordination Committee (PCC): 2×/year
- Work Package Coordinators JRA: N°1-7
- Work Package Coordinators NA: N°1-6
- Work Package Coordinators TNA: N°1-7

Managing institution:
- GANIL
- FISCO
- NA01
The ENSAR 2 proposal aims in:

• Support the access costs to the research infrastructures at the highest possible level and >> than few % of real operational cost today

• Support to the scientists, especially the young researchers, participating in experiments at these infrastructures

• Support to the novel instrumentation and theory developments leading to strong improvements of the research infrastructures through Joint Research Activities

• Support to the synergy of the community and promoting and facilitating the use of the research infrastructures through Networking Activities
FP8 ENSAR 2

Partners of ENSAR

7 -> 8 TNA Facilities

29 -> 40 beneficiaries
≥ 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

M. Lewitowicz, NuPECC Meeting, 5-6/10/2012, Sevilla
TANDEM Accelerator at IFIN-HH

- 9 MV TANDEM accelerator, completely modernized
- 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$_3$ :Ce detectors

M. Lewitowicz, NuPECC Meeting, 5-6/10/2012, Sevilla
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
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 multidetector system JANOSIK; 12HPGe gamma-ray multidetector 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.

*EAGLE HPGe-array at HIL*

*Contact: Adam.Maj@iff.edu.pl*
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 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: ≥ 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 NuPECC members and the community to help in the preparation of the ENSAR 2 proposal (in particular suggestions for NAs and JRAs)
Thank you for your attention