



The EURISOL Distributed Facility Initiative

Marek Lewitowicz On behalf of the EURISOL Steering Committee

- Motivation
- What is EURISOL Distributed Facility Initiative?
- Further steps













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Energy domain





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EURISOL: Precision experiments with RIB at low cross sections and very exotic nuclei at few MeV/nucleon





-> EURISOL-DF (Distributed Facility) Initiative from 2014 as an intermediate step towards EURISOL

EURISOL DF





Complete urgently the construction of the ESFRI flagship FAIR and develop and bring into operation the experimental programme of its four scientific pillars APPA, CBM, NUSTAR and PANDA.

Support for construction, augmentation and exploitation of world leading ISOL facilities (ISOLDE, GANIL-SPIRAL2, SPES) in Europe towards EURISOL (EURISOL-DF).





Support for the full exploitation of existing and emerging facilities.

Support for ALICE and the heavy-ion programme at the LHC with the planned experimental upgrades.





Support to the completion of AGATA in full geometry.









NuPECC Long Range Plan 2017 Perspectives in Nuclear Physics

Support for construction, augmentation and exploitation of world leading ISOL facilities in Europe.

The urgent completion of the ESFRI facility SPIRAL2 along with SPES and the energy and intensity upgrade of HIE-ISOLDE (+ storage ring), including their unique instrumentation will consolidate the leading role of Europe. These ISOL facilities with low energy and reaccelerated exotic beams, offer extraordinary opportunities for scientific discoveries to probe questions that concern the atomic nucleus and nuclei in the cosmos. The successful completion and exploitation of these facilities would be the major step toward the ultimate European ISOL facility, EURISOL. With this aim, a strong European collaborative initiative, the EURISOL-Distributed Facility, is strongly supported to maximize synergies to address and solve new scientific and technical challenges.

EURISOL – Distributed Facility (DF) Initiative



EURISOL MoU

The EURISOL MoU establishes a common understanding among the Parties of the collaborative effort required for the continued development of EURISOL, including more focused R&D and a more refined cost estimate.

Signatories: CERN, COPIN (Poland), BEC (Belgium), GANIL, INFN, JYFL The MOU is implemented by a Steering Committee with one representative per signatory. The members are:

MJG Borge/G. Neyens (CERN), M. Lewitowicz (GANIL, chair), A. Maj (COPIN), S. Pirrone (INFN), L. Popescu (BEC), A. Jokinen (JYFL) A. Bracco/ML (NuPECC representative) and Y. Blumenfeld (EURISOL JRA ENSAR2, invited), Berta Rubio (Chair of the EURISOL User Executive Committee, invited)



RIBs and Beam Time



https://web.infn.it/spes/index.php/news/spes-beam-tables

RIBs and Beam Time

Beam Time for users & simultaneous operation

# of Months of RIB/year*	Today	In the next few years	Nominal	Nominal # of simultaneous RIB
ISOLDE	7	7	7	2
GANIL-SPIRAL2	1	4	8	2
SPES		4	8	1
ISOL@MYRRHA			4,5	2
ALTO	0,7	1,2	1,2	1
JYFL	2	2,5	2,5	1
Total	10,7	18,7	31,2	9

RIB energy range 0(keV) - 10 MeV/nucl.

* Including beam preparation & development time

See « Contributions from the facilities... » by Yorick Blumenfeld



The goals of EURISOL-DF project (1/3)

- Implement a new scientific policy tackling major problems in nuclear physics at ISOL-based European facilities_and in particular:
 - organise experimental campaigns using all available observables, techniques, facilities and theoretical approaches to answer key questions in nuclear structure (eg. modifications of magic numbers in nuclei far from stability) and astrophysics (eg. genesis of medium to heavy mass elements in the Universe);
 - have a single-entry point for physics programmes that require beam from at least two EURISOL-DF facilities ;
 - the EURISOL-DF facilities agree to provide a significant fraction (up to 50%) of the Radioactive Ion beam time dedicated for such physics programmes, for which beam time will be distributed via the EURISOL-DF Program Advisory Committee

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The goals of EURISOL-DF project (2/3)

- promote and coordinate the development, construction and operation of the ISOL RIB facilities in Europe;
- develop R&D on RIB production and instrumentation towards EURISOL and in particular:
 - organise and open to all EURISOL-DF members the R&D platforms to develop RIB (ex. ion source test benches, target developments, separation techniques) and detector systems;
- promote user driven policy with an important role played by the EURISOL User Group and the EURISOL Instrumentation Coordination Committee in order to organise and optimize the campaigns of travelling detectors and arrays;



The goals of EURISOL-DF project (3/3)

- Have EURISOL-DF included on the ESFRI list by 2020 and attract additional member states and EU funds, in particular:
 - in-kind and/or cash contributions of the members for joint developments for EURISOL in the domains of accelerators, RIB production and instrumentation for experiments;
- Establish a joint strategy in education and training in nuclear science (eg. organising joint summer schools, hands on training, topical workshops and conferences);
- Develop EURISOL as a single site facility as a long-term goal.



EURISOL-DF Organisation (Preliminary)



EURISOL-DF Organisation (Preliminary)







Close collaboration and synergies FAIR/NUSTAR – EURISOL-DF

- Unified approach to the nuclear physics topics (examples):
 - Nuclear structure and reactions for explosive nucleosynthesis
 - Modifications of shells closures
- Synergies in the construction and campaigns of (moving) arrays and detectors
- Collaborative approach of the whole European nuclear structure and reactions community
 - Joint input and support for the ESFRI (FAIR, GANIL-SPIRAL2, MYRRHA, EURISOL-DF and EU projects (ENSAR2 and beyond)
 - Joint conference (EURORIB) and topical meetings

Collaboration agreement between FAIR/NUSTAR and EURISOL-DF to be prepared, discussed and hopefully signed in the coming months

EURISOL – Distributed Facility (DF) Initiative – next steps

- First draft of the full EURISOL-DF proposal (executive summary) including the WG reports, feed-back from the Lisbon conference, NuPECC LRP recommendations by June 2018
 - Writing Committee (A. Bracco, Y. Blumenfeld, B. Rubio and M. L.) in a close collaboration with the EURISOL Steering Committee and EURISOL UEC
- EURISOL Town Meeting July 2-4, 2018 in Pisa
 - Presentation and discussion of the pre-proposal with the EURISOL Community

> Executive Summary finalised by August 2018 (draft by the end of July)

Meetings with funding agencies in order to ensure a support from at least 3 EU countries (France, Italy, CERN and also Belgium, Finland, Poland,...) – September – December 2018



EURISOL

EURISOL-DF in the H2020 IA project beyond ENSAR2?



Acknowledgements



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- S. Pirrone (INFN),
- L. Popescu (BEC),
- A. Jokinen (JYFL),
- A. Bracco (INFN),

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- A. Facco,
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M. Lewitowicz



BACKUP SLIDES





EURISOL-DF Pan-European added value

- Optimal approach to study major questions in modern nuclear structure physics, nuclear astrophysics and related applications
- European coordination of EURISOL related physics and technical R&D
- Secured resources for operation of the ISOL facilities and additional resources for R&D and detectors
- Clear strategy for upgrades of the complementary EU ISOL facilities towards EURISOL

EURISOL User driven policy: Example EICC



EURISOL-DF Instrumentation Coordination Committee (EICC)

The role of the EICC is to reinforce the synergies and coordinate efforts between the facilities and the major collaborations on existing and new detectors in order to carry on **R&D** and to **reach construction milestones** and **coordinate experimental campaigns** at all RIB facilities which are members of EURISOL-DF.



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Strong scientific case for RIB science and applications



Physics light exotic nuclei WS Lisbon

http://www.ensarfp7.eu/projects/eurisol-net/documents

EURISOL User Group