

Introduction to

EURISOL

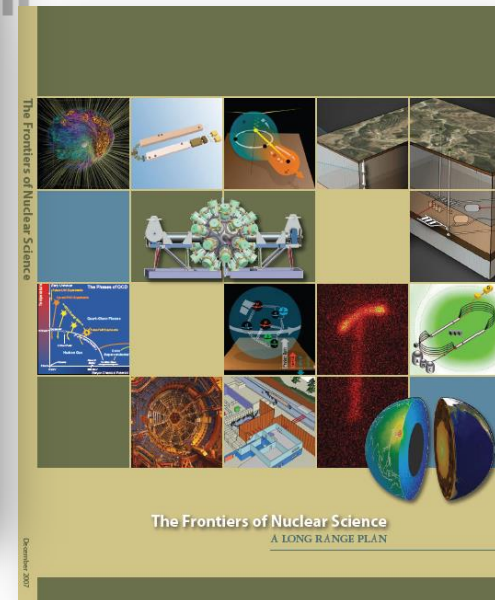
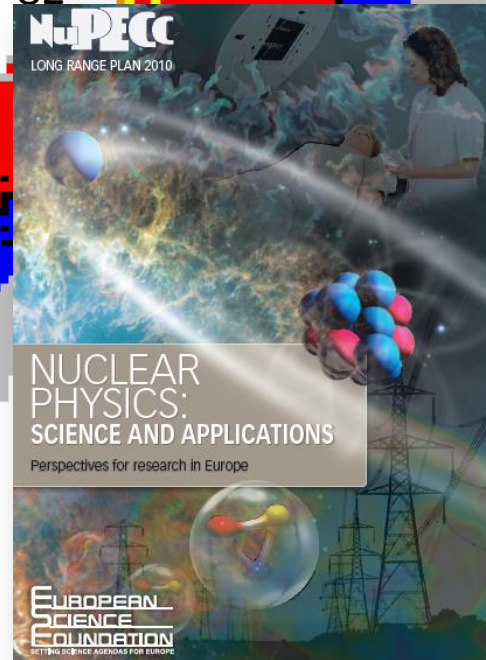
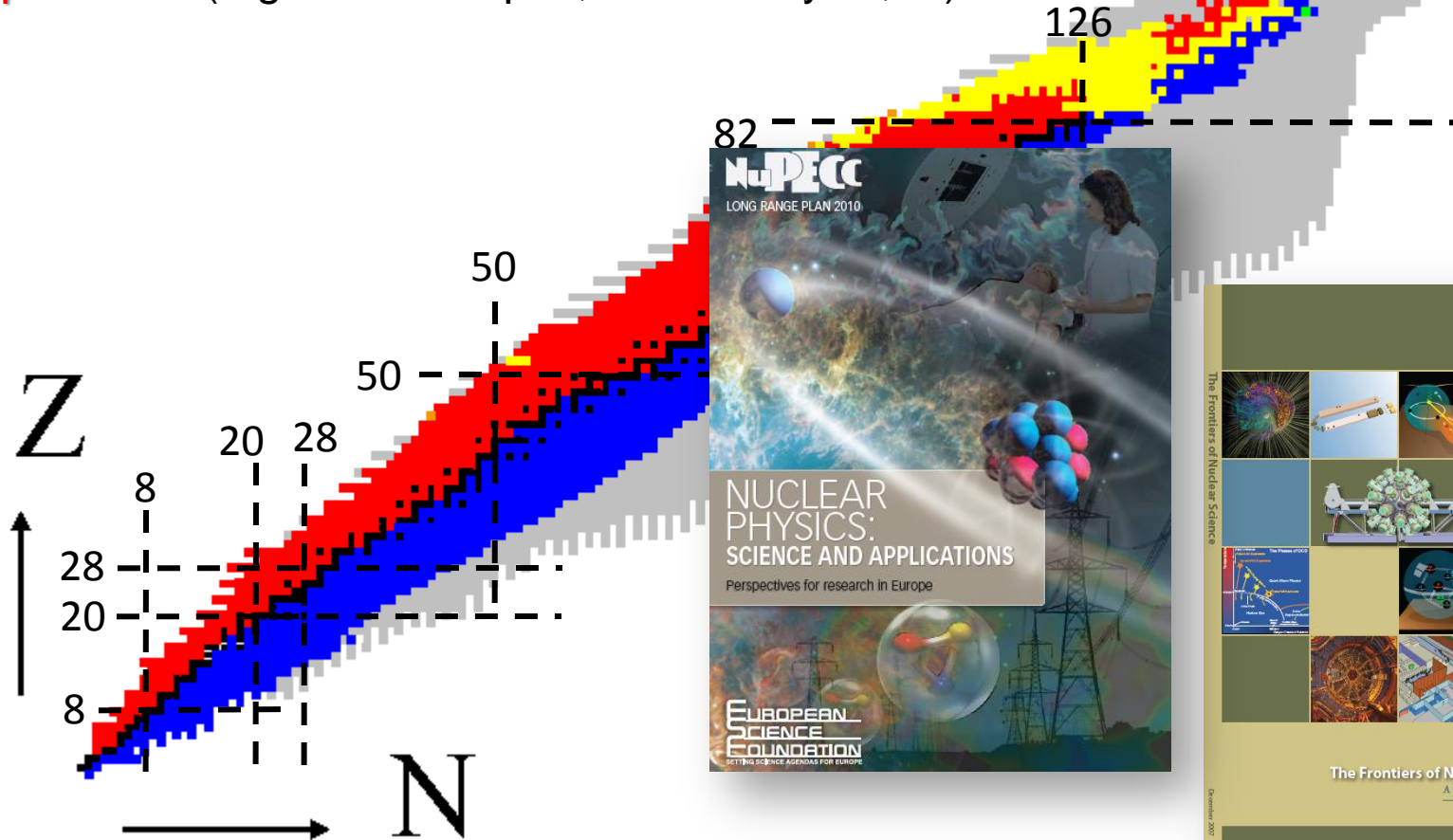
Piet Van Duppen
KU Leuven (Belgium)
*on behalf of Yorick Blumenfeld
and the EURISOL Project Office*



- A Short History
- The EURISOL Concept
- The EURISOL transition period: 2010 - 2015
- What Next?

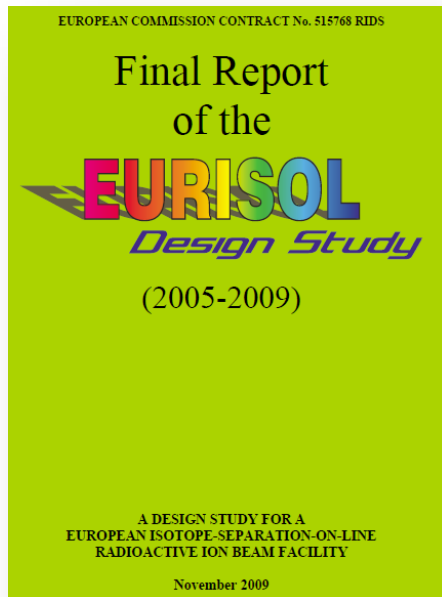
EURISOL: production radioactive isotopes

- To answer **fundamental questions** in **nuclear physics, nuclear astrophysics, fundamental interactions and atomic physics**
- **Applications** (e.g. radioisotopes, trace analysis, ...)



Short History

- 2000: The Idea to Build an Ultimate ISOL facility for EUROPE is born
- 2001-2004: EURISOL RTD in 5th framework program: Conceptual Design
- 2005-2009: EURISOL Design Study in 6th framework program
- 2010: Endorsed by NuPECC as highest long term priority for low energy nuclear physics in Europe
- 2010 – now: transition period towards the realization of EURISOL



The EURISOL Concept: bird's-eye view



The EURISOL Concept: schematic

Multi-user capabilities

Up to 150 A.MeV for ^{132}Sn

3 x 100 kW targets

(REX-ISOLDE, SPIRAL ~ few kW
HIE-ISOLDE ~ 10kW, TRIUMF ~ 50 kW)

1 x 4 MW converter (fission) target

(SPIRAL-2 ~ 200kW, SPES ~ 100 kW)

3 x post-accelerators:

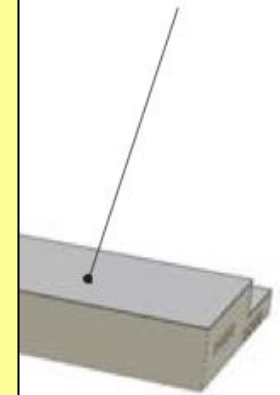
150 A.MeV ^{132}Sn for secondary fragmentation

1-5 A.MeV Coulomb barrier nuclear physics

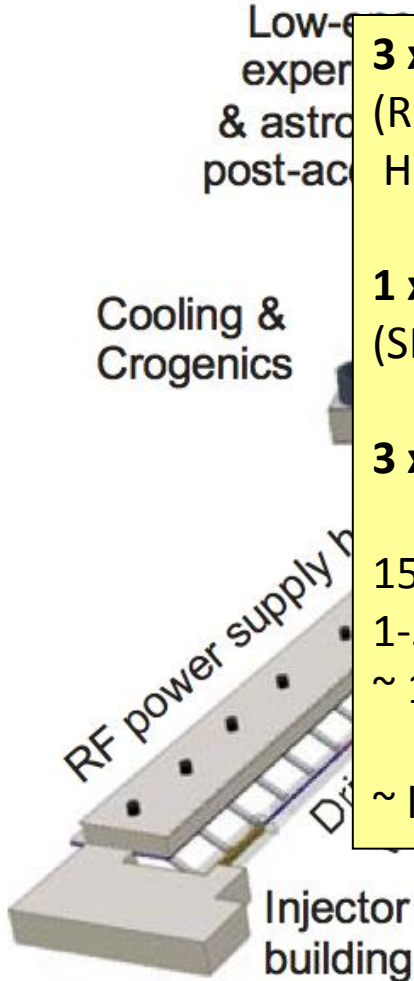
~ 1 MeV nuclear astrophysics

~ keV ground states, solid-state physics, etc.

Fragment separator & high-energy experiments

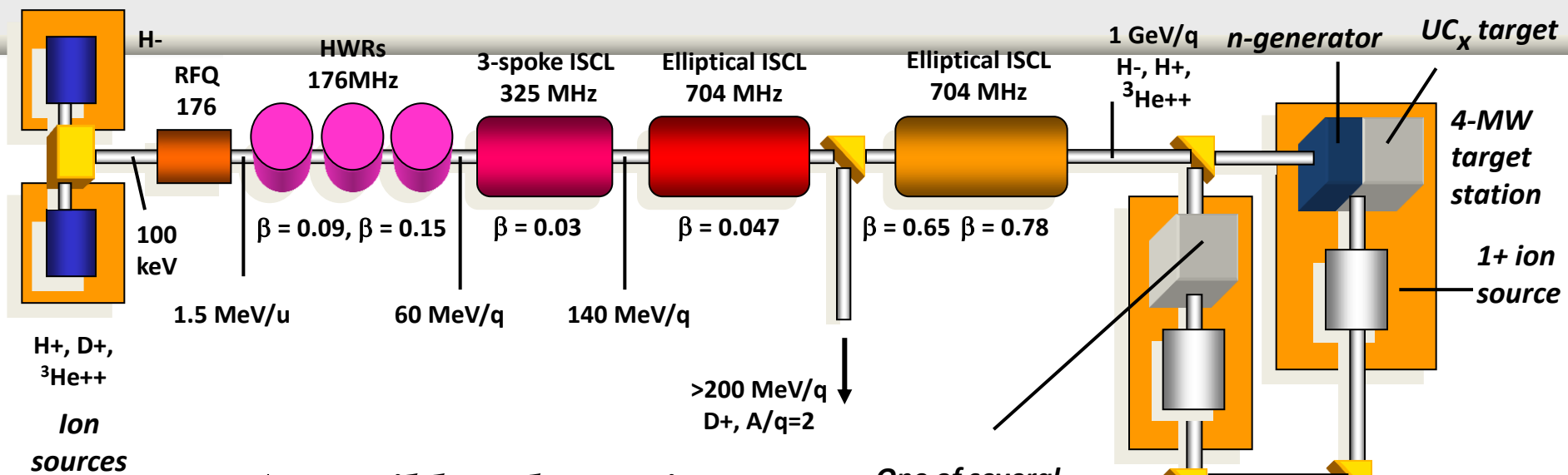


Post-accelerators (below ground) & RF power supplies



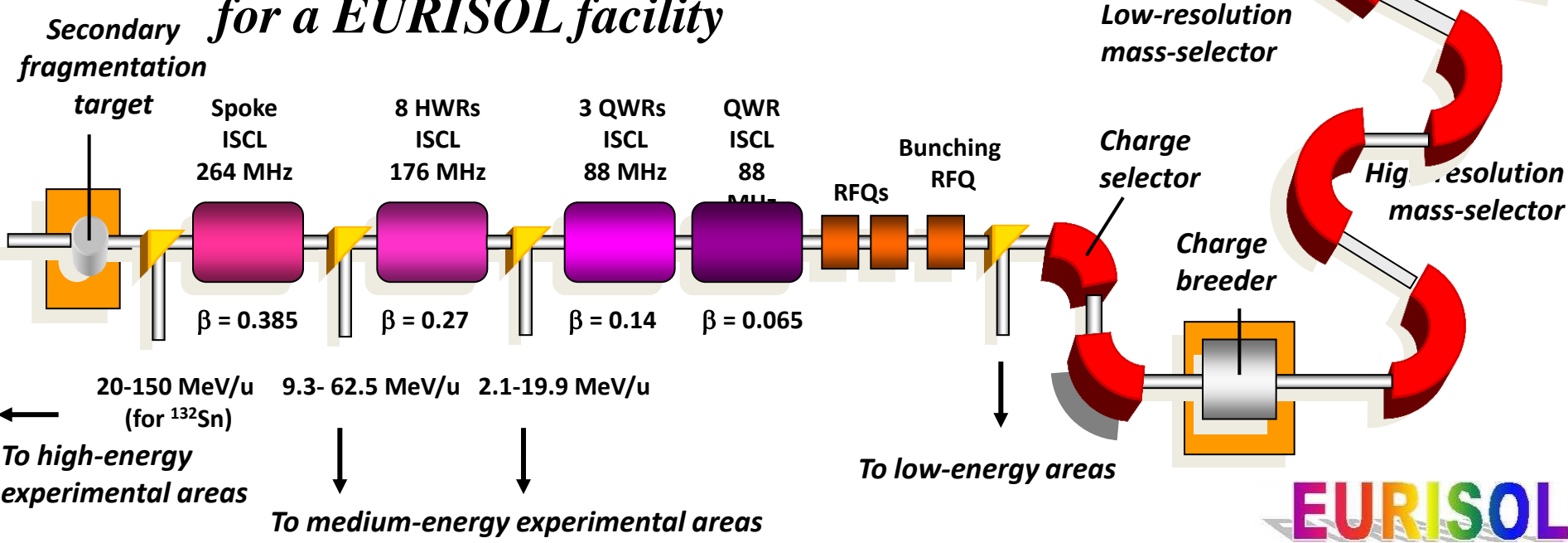
Multi-MW ^{235}U target 3 100-kW targets Control room Physics and administration

LINAC: H, D, He and $A/q=2$ ions up to 1 A GeV

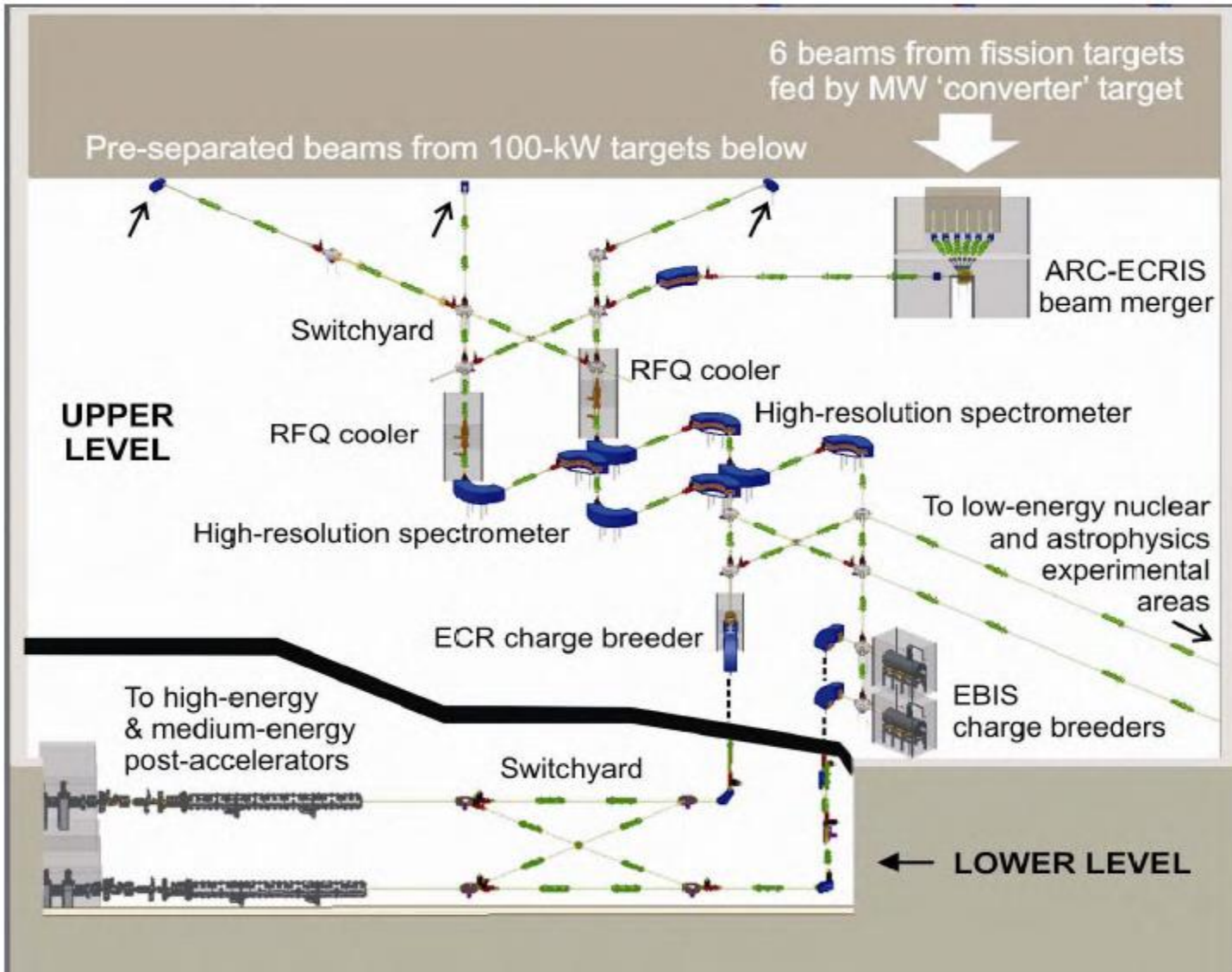


A possible schematic layout

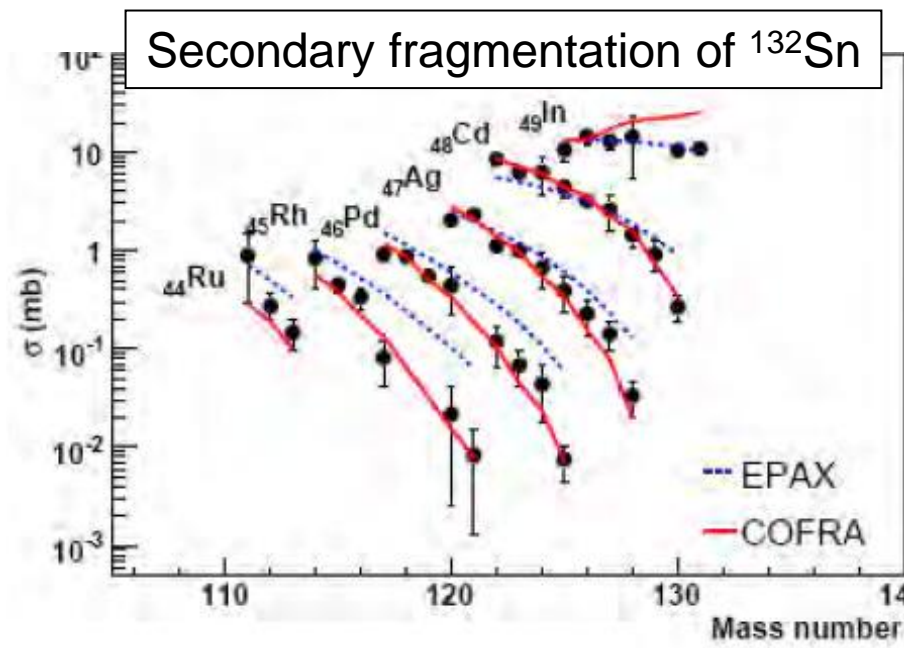
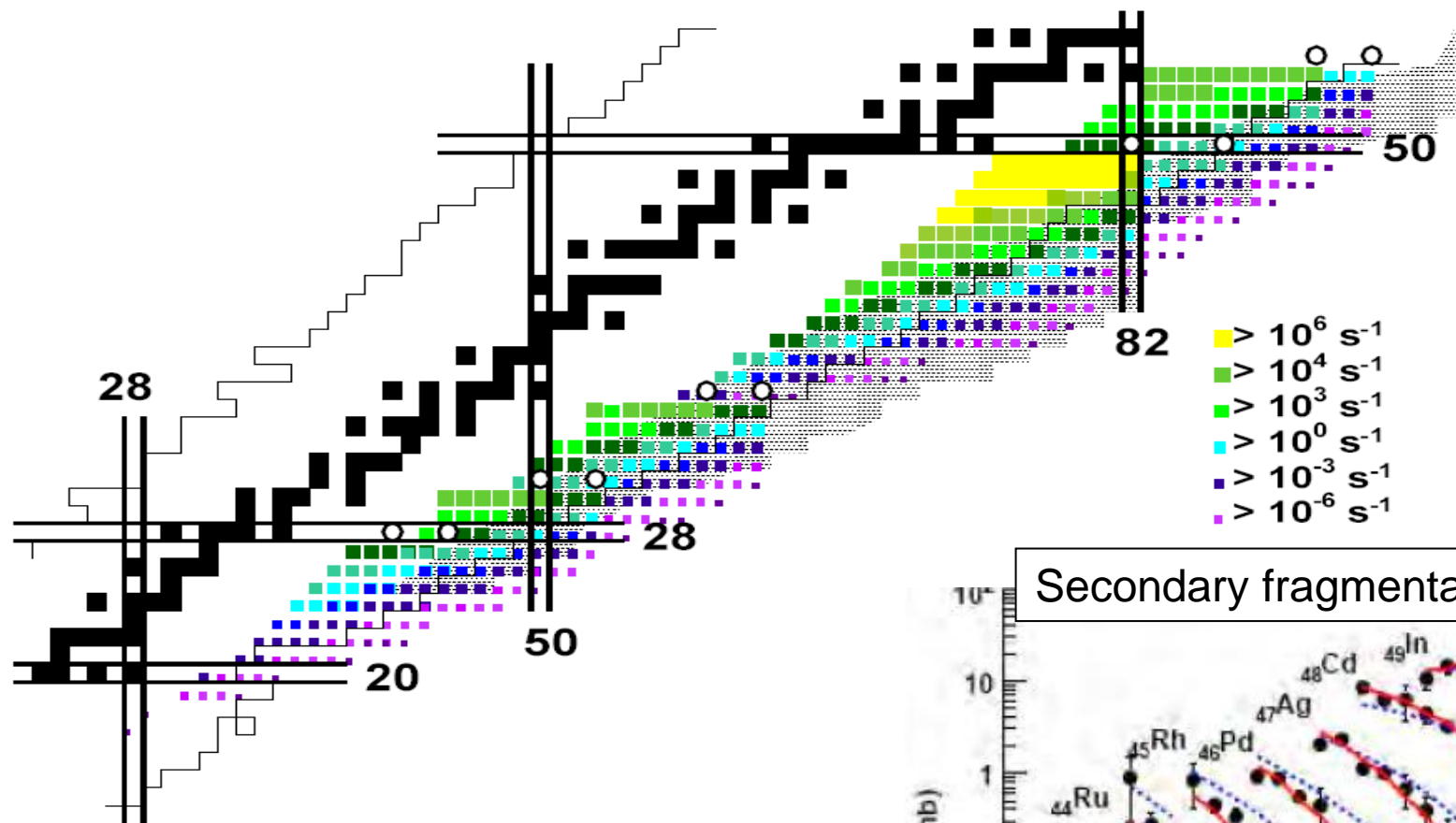
for a EURISOL facility



The EURISOL Concept: multi-user aspect



Secondary Fragmentation of Fission Fragments at EURISOL



Roadmap to Eurisol

TODAY

ISOLDE

2014-2025

ISOLDE

INFN LNS - EXCYT

SPES
exotic beams for science

SPIRAL - GANIL

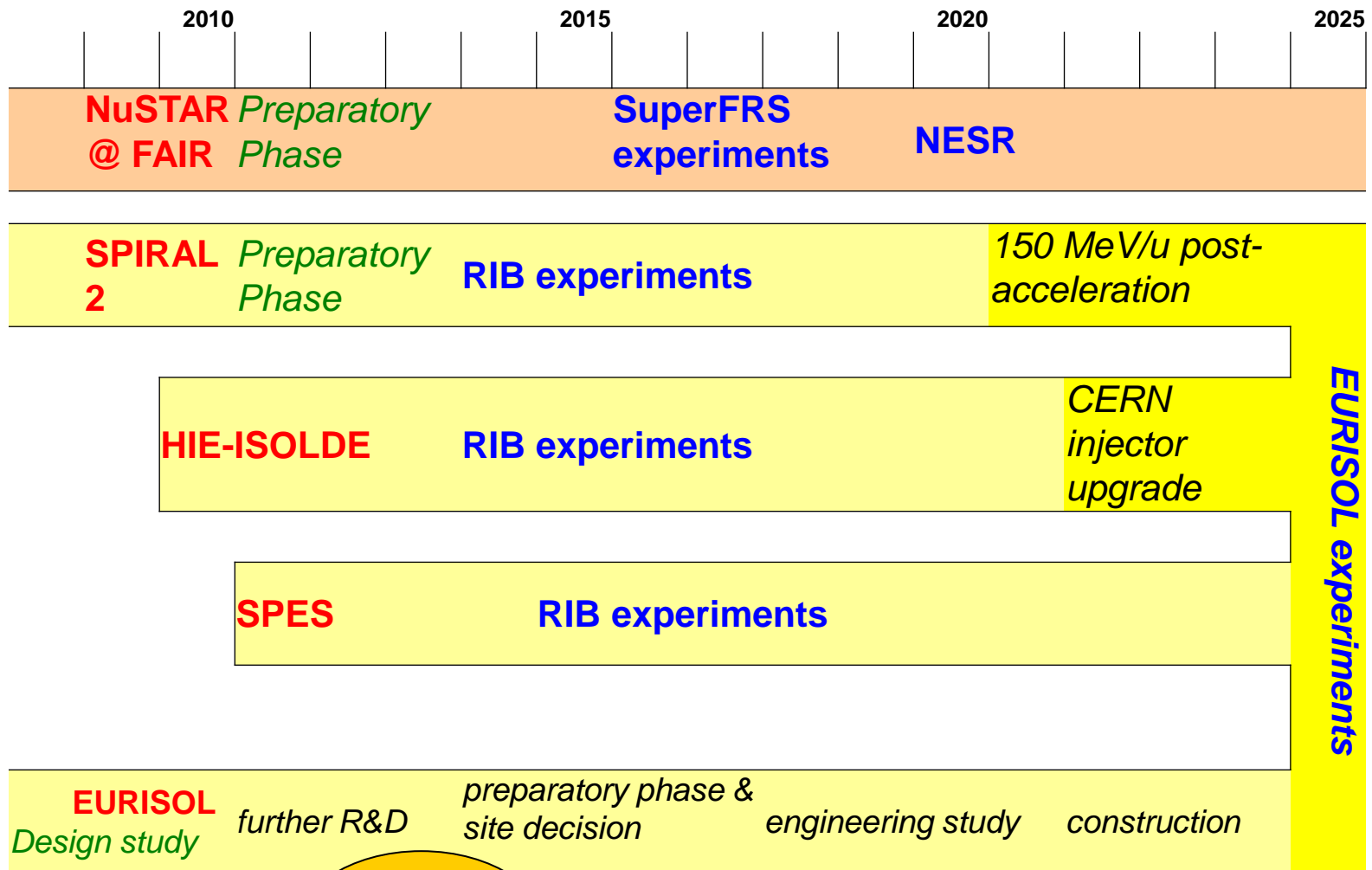
GANIL
laboratoire commun CEA/DSM
spiral2 CNRS/IN2P3

EURISOL

2025 -

EURISOL

Roadmap to Eurisol



ESFRI
List

The EURISOL transition period (2010-2013)

➤ Update/shape the physics case/instrumentation:
see talks from A.Navin, I. Moore, G. Correia



➤ Perform further R&D for RIB production/acceleration:
see talks from J. Benlliure, S. Bousson, T. Stora, Y. Kadi, P. Delahaye, J.C. David, P. Vaz, A. Andrichetto



LIEBE

➤ Contact with science strategy making, funding, political bodies:
see talks from A. Bracco: NuPECC

➤ Synergies with other facilities in Europe:
see talks from L. Calabretta (SPES), H. Savajols (GANIL), T. Giles (ISOLDE), C. Darve (ESS), L. Popescu (SCK-CEN)

➤ EURISOL on the ESFRI list and EURISOL Preparatory Phase

The EURISOL transition period (2010-2013)

- **The EURISOL project office**
(Y Blumenfeld *chair*, A Facco, M Lewitowicz, P Van Duppen)
setting up the EURISOL collaboration: (MOU circulating)
- **The EURISOL User Group (A. Bonaccorso *chair*)** + elected executive committee
 - Organizes topical meetings and town meetings in collaboration with EURISOL-NET
 - Catania Dec. 2009: Structure of r-process nuclei
 - Valencia Feb. 2011: Neutron-deficient nuclei
 - Lisbon, Oct. 2012: Town meeting + topical meeting on Light nuclei
- **The EURISOL-NET Network in ENSAR (105 k€; Y. Blumenfeld *leader*)**
 - Participants: CERN/ISOLDE, IN2P3/IPNO, INFN/LNS, PISA, IN2P3/IPNO, JYFL
 - Task 1: Coordination of R&D (Y. Kadi *leader*)
 - Task 2: Physics and Instrumentation (A. Bonaccorso *leader*)

What Next?

- Roadmap Discussion – some elements to be discussed:
 - Further R&D to prepare EURISOL
 - Synergies with exciting facilities or facilities under construction/consideration
 - Next step for the EURISOL MoU and the EURISOL collaboration
 - Get EURISOL on the ESFRI list
 - Site selection
 -

Roadmap Discussion

- **Final aim:**

- Current ISOL-based projects and physics supported
- EURISOL in Europe >2025 (realistic in view of the current financial situation? site selection)

- **Eurisol on the ESRRRI list:** EU funding and trigger local funding

Note: FAIR and SPIRAL2 moved to the implementation phase

- **Eurisol as a distributed facility:**

Initially: GANIL-SPIRAL2, HIE-ISOLDE and SPES.

Other potential ideas: ISOL@MYRHHA, ESS?

Smaller scale ISOL facilities; ALTO, JYFL, ECXYT

What is a distributed facility?

Physics, R&D on RIB production, Instrumentation

Coordination committee: role, responsibility

- **Eurisol collaboration:** major ISOL-based RIB facilities, other labs, funding agencies, university groups

- MoU: steering committee
- Synergies on R&D with/for EURISOL

- **EU support through ENSAR 2?**

- EURISOL as a TNA next to e.g. in-flight (GSI), ECOS (stable beam)
- JRA activities focused on EURISOL (thus ISOL based)