ISOL@MYRRHA within the EURISOL-DF Context

Lucia Popescu (SCK•CEN)
- Driver-beam power on ISOL@MYRRHA target: 60-120 kW
- Low-energy RIBs
- Experimental programme complementary to other ISOL facilities – long-run experiments
ISOL@MYRRHA will prioritize experimental programmes which require of extended beam times with stable operation:

- hunt for very rare phenomena
- need high statistics
- need many time-consuming systematic measurements
- have inherent limited detection efficiency

QED tests in HCl

Bohr-Weisskopf: A- and g-factors
Ultra-high selectivity: LIST configuration

Rare decays: GTGR, $\beta_{\text{xn}}$, $\beta_{\text{pp}}$, cluster decay, SHE
Extreme precision: e.g., crystal spectrometry

Correlations ($\beta-\nu$, ...), EDM: Statistics to control systematic effects of setup

Systematic sample measurements

Systematic sample measurements

radio production of Radiopharmaceuticals

Dedicated radiotherapy center

Month
Year

L. Popescu (SCK•CEN)
ISOL@MYRRHA Project

- ISOL@MYRRHA Feasibility Study carried out within BriX-IAP6 (2007-2012)

- Technical & Scientific report submitted to NuPECC
  ➔ 2010 – Technical Design of ISOL@MYRRHA in the NuPECC lrp

- Detailing the Design, updating the Scientific Case and building the Users Group through a series of topical workshops
  BriX-IAP7 (2012-2017)

Timeline

Government decision on MYRRHA ➔ Commissioning of the accelerator

2012-2015 Conceptual Design
2015-2017 Detailed Engineering Design
2018 Awarding construction contracts
2019-2021 Components Manufacturing & construction
2022 Assembly and Installation
2023-2024 Commissioning
2025-Operation

- MYRRHA included in the new Belgian Government Agreement (10 October 2014)
Belgian EURISOL Consortium

- Created in 2013
  - Aim:
    - Coordinated RTD programme – ISOL developments
    - Joining EURISOL collaboration (MOU signed in July 2014)

- Chair: R. Raabe (KU Leuven)
- Vice-Chair: P. Planquart (VKI)
Potential Contribution of ISOL@MYRRHA to EURISOL-DF
High power direct targets development

- Highest proton-beam power on an ISOL target today: **50 kW** at TRIUMF-ISAC facility

- Limited by thermal conductivity of target materials

- ISOL@MYRRHA will run at **60-120 kW** => new target design is needed

L. Popescu (SCK•CEN)
High power direct targets development

- Solid targets for ISOL@MYRRHA:
  - Targets based on ISAC design
    - refractory metal foils (e.g., Ta, Nb, Ti)
    - carbide powders sintered on a graphite sheet (e.g., ZrC/C, SiC/C)
    - UCx/C targets - fully exploited at ISOL@MYRRHA

- The concept for the EURISOL 100-kW solid target to be further developed
High power direct targets development

- Loop-type targets for ISOL@MYRRHA
  - Molten-metal targets
    E.g. LIEBE: Pb-Bi loop
  - Powder targets

The two new concepts allow further increase of beam power on target

L. Popescu (SCK•CEN)
RIB production at ISOL@MYRRHA

- Target-station design
  - Based on the concept at TRIUMF-ISAC
  - New features:
    - vacuum connection at beam level
    - radiation resistant remote vacuum connection /disconnection for target exchange
    - vacuum-tight target box
    - reliable remote services connection and disconnection
    - remote maintenance, repair and exchange of the various components

- Target handling (concept similar to MYRRHA)

- Licensing
Contribution of ISOL@MYRRHA to EURISOL-DF - summary

- High power direct targets development:
  - Solid targets based on TRIUMF-ISAC design
  - Molten-metal targets
  - Powder targets

- Target-station design and operation procedure (shielding, remote handling, maintenance, waste handling and disposal, etc.)

- Complementary physics programme