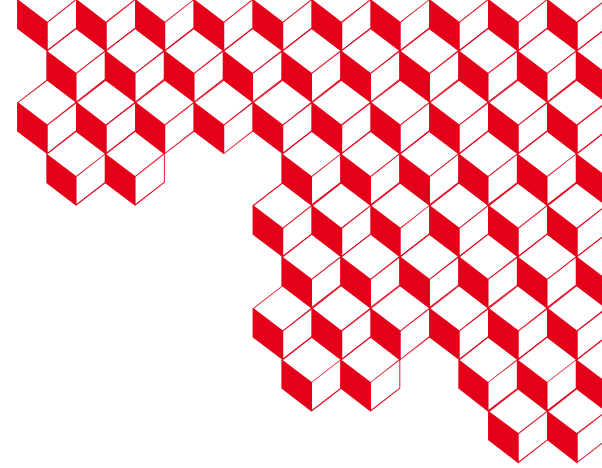




irfu



# **Scientific and Technical Committee Nuclear Physics Department**

*Stefano Matthias PANEBIANCO – CSTD DPhN – Saclay – June 12<sup>th</sup> 2024*

[stefano.panebianco@cea.fr](mailto:stefano.panebianco@cea.fr)

# Organization

- Internal members:
  - Francesco Bossu
  - Eric Dumonteil (new entry)
  - Stefano Matthias Panebianco (chair)
  - Vittorio Somà (secretary)
  - Barbara Sulignano
  - Marine Vandebrouck (new entry)
- Elections took place on October 6<sup>th</sup> (first round) and 11<sup>th</sup> (second tour)
  - Thanks to Nicole d'Hose and Thomas Materna for their important contribution to the activities of the CSTD
  - Welcome to Marine and Eric

# Organization



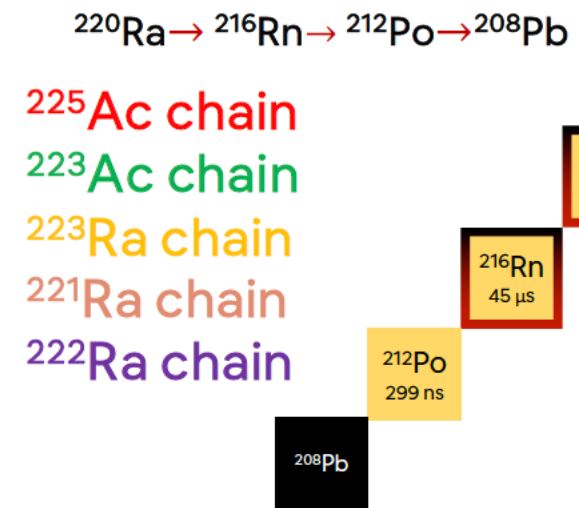
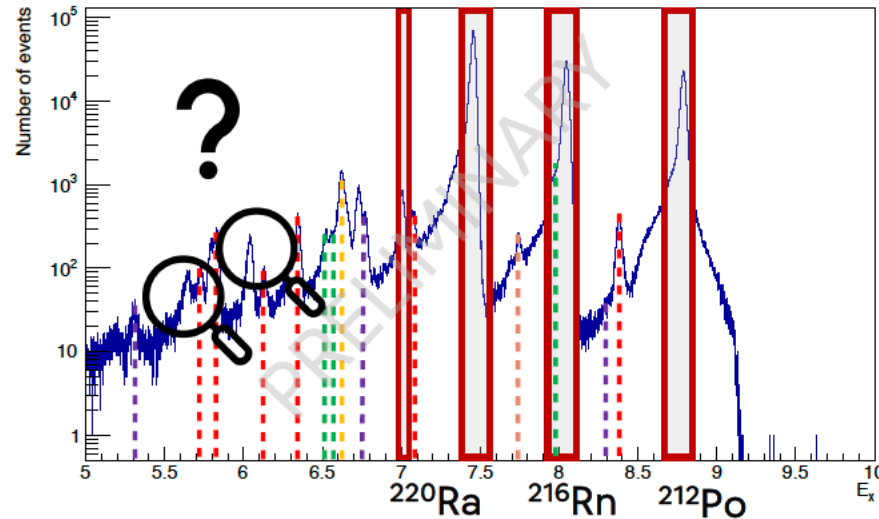
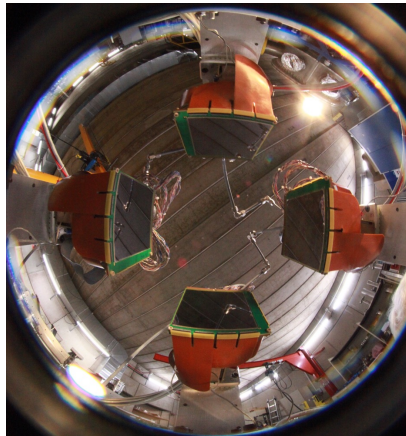
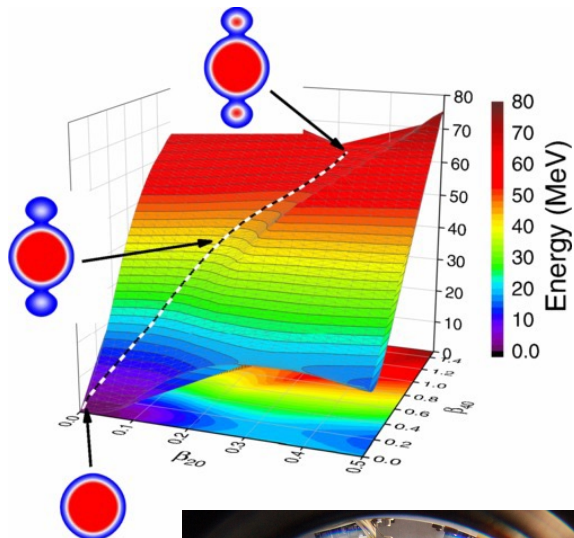
- Content of today's session:
  - Exploring the hadron structure at Jefferson Laboratory (Francesco Bossù, Maxime Defurne)
    - Referees:
      - Salvatore Fazio (Università della Calabria)
      - Kresimir Kumericki (University of Zagreb)
      - Marine Vandebrouck (Irfu/DPhN)
    - Heavy-ion physics at LHCb (Michael Winn, Benjamin Audurier)
      - Referees:
        - Gaëlle Boudoul (Antenne IN2P3 CERN Preveessin)
        - Anton Andronic (Universität Münster)
        - Eric Dumonteil(Irfu/DPhN)
  - Next CSTD plenary session will be scheduled in T1 2025
    - Projects to be evaluated under discussion

# News on previously evaluated projects

1. **Double alpha radioactivity at ISOLDE**
2. **CRAB**
3. **EIC**

# News from double alpha radioactivity

- Theoretical trigger in 2021 (*Phys Rev. Lett.* 127 (2021) 012501)
- Experiment at GSI-FRS Ion Catcher in 2022 with  $^{224}\text{Ra}$  and  $^{220}\text{Ra}$  beams (*Nucl. Instrum. And Meth. A* 1063 (2024) 1669252)
- Experiment at CERN-ISOLDE with  $^{220,222}\text{Ra}$  and  $^{216,218}\text{Ra}$  beams (1 week)
- Analysis is ongoing (PhD thesis of Louis Heitz)



PI: Christophe Theisen

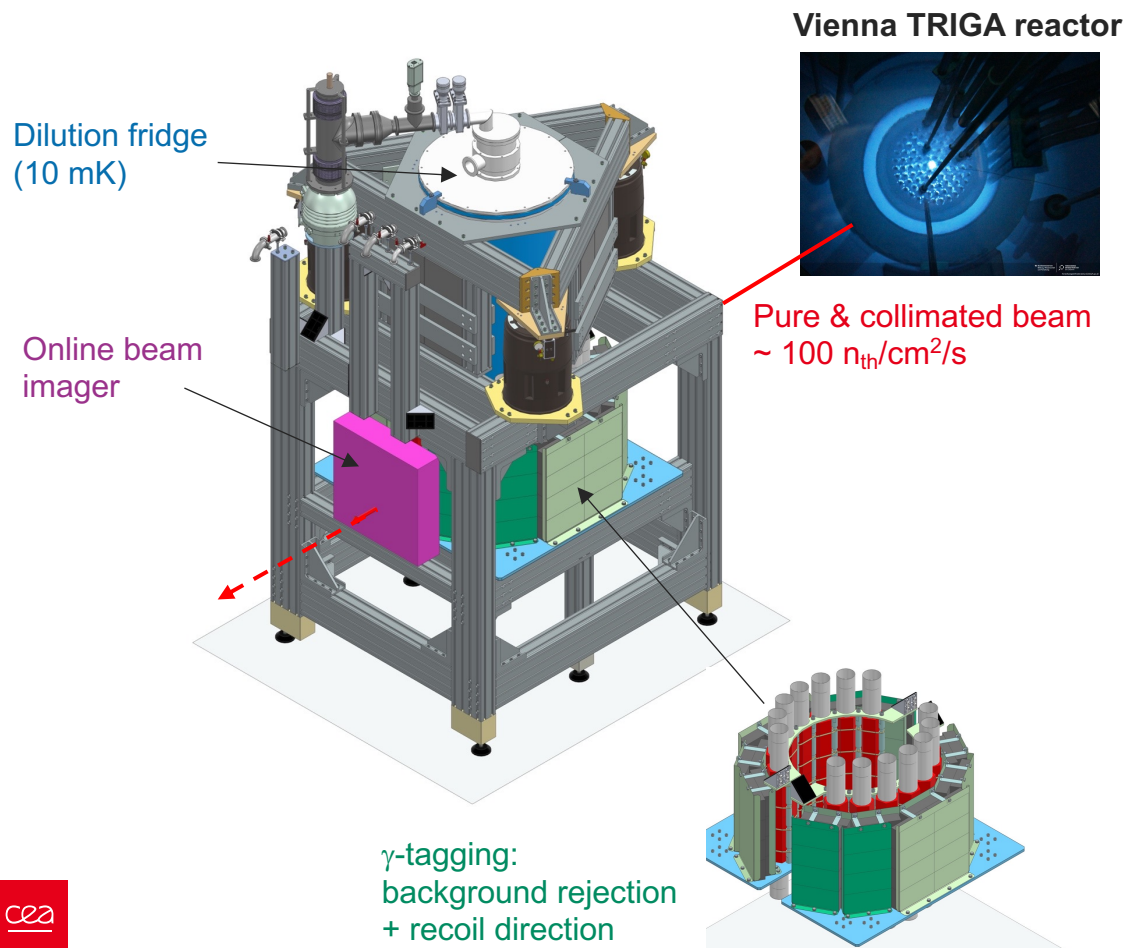
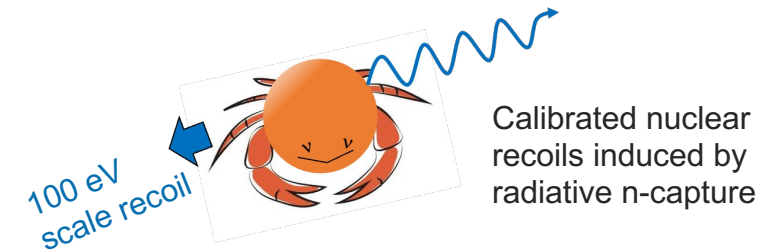
# News from double alpha radioactivity



PI: Christophe Theisen

# CRAB: sub-keV calibration of cryodetectors

- Proposed by DPhN to calibrate mono-energetic nuclear recoils in the 0,1-1 keV range induced by radiative neutron capture in the bulk of a cryogenic detector (*JINST 16 (2021) 07, P07032*)
- First experimental validation (*Phys. Rev. Lett. 130 (2023) 21, 211802*)
- Now preparing high precision phase (*Phys. Rev. D 108 (2023) 7, 072009*)x



## Rich physics program

- **Coherent neutrino scattering** (Nucleus, IJCLab)  
Calibration of the Nucleus  $CaWO_4$  detectors
- **Molecular Dynamics simulation of crystal defects**  
DRF/Irfu – DES/DRMP (– DIF/DCRE), PTC “Cascade”
- **Test of nuclear models** (DRF/Irfu – DES/Iresne)  
FIFRELIN code, PTC “Significant”
- **Light dark matter** (IJCLab, IP2I-Lyon)  
Calibration of the TESSERACT Germanium detectors  
Study of quenching factor

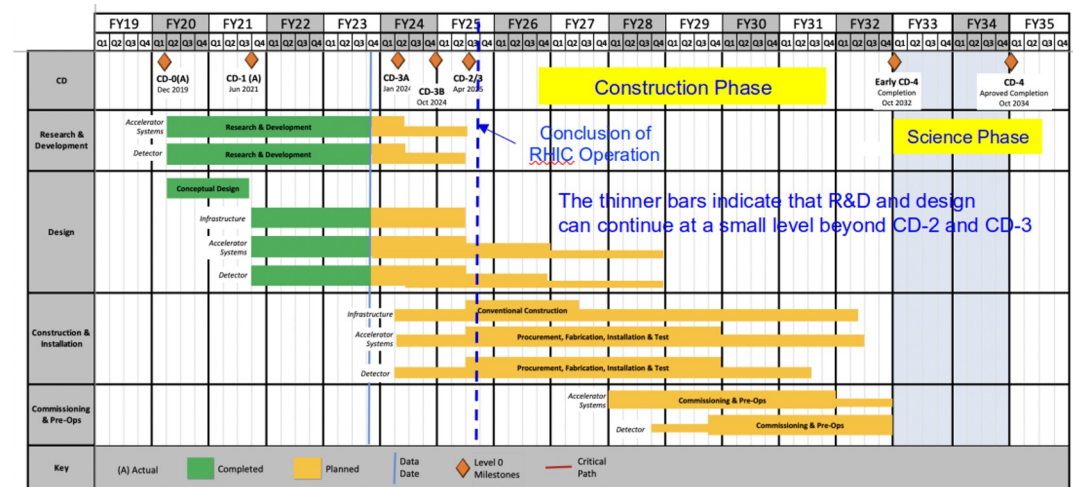
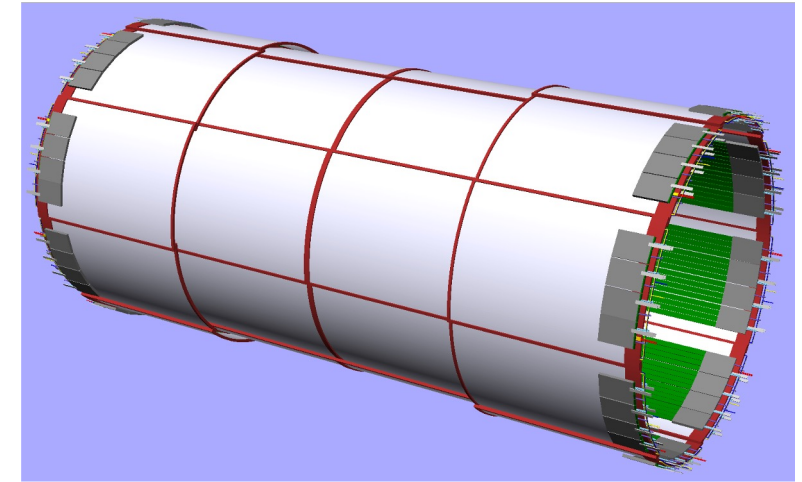
2024-25

2026

PI: David Lhuillier

# EIC: CyMBal and SALSA

- DEDIP and DPhN are involved in the design and development of a tracking layer for the ePIC experiment and its readout electronics
- The Cylindrical Micromegas Barrel Layer (CyMBaL) consists of 32 resistive Micromegas tiles equipped with 2D readout strips
  - Evolution of the MM technology developed for the CLAS12 experiment
  - About 10 m<sup>2</sup> of active area
  - Ongoing R&D to optimize the 2D readout and the resistive layer
  - Aiming at full production in Saclay – MPGD Lab
- SALSA, a new versatile ASIC for MPGD readout
  - Ongoing development in collaboration with Sao Paulo University
  - Based on 65 nm technology
  - Full chain: front-end + ADC + DSP
  - Compatible with streaming readout
  - The ePIC will use about more than 4000 chips
- Timeline, tight schedule of EIC Project
  - Pre-TDR expected by the end of 2024
  - Start of construction (CD3) in end 2025
  - Installation of CyMBaL in mid 2029
  - Start of operations end 2032
  - In2p3 and lrfu are preparing a request for funding to the French ministry



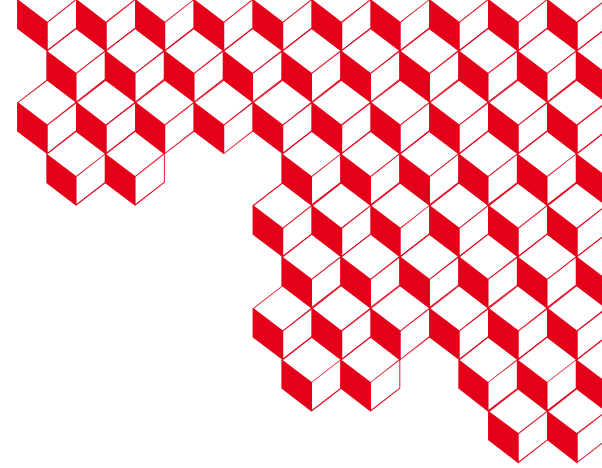
E. Aschenauer, ePIC general meeting, May 30th

PI: Francesco Bossù





irfu



# **Scientific and Technical Committee Nuclear Physics Department**

*Stefano Matthias PANEBIANCO – CSTD DPhN – Saclay – June 29<sup>th</sup> 2023*

[stefano.panebianco@cea.fr](mailto:stefano.panebianco@cea.fr)