

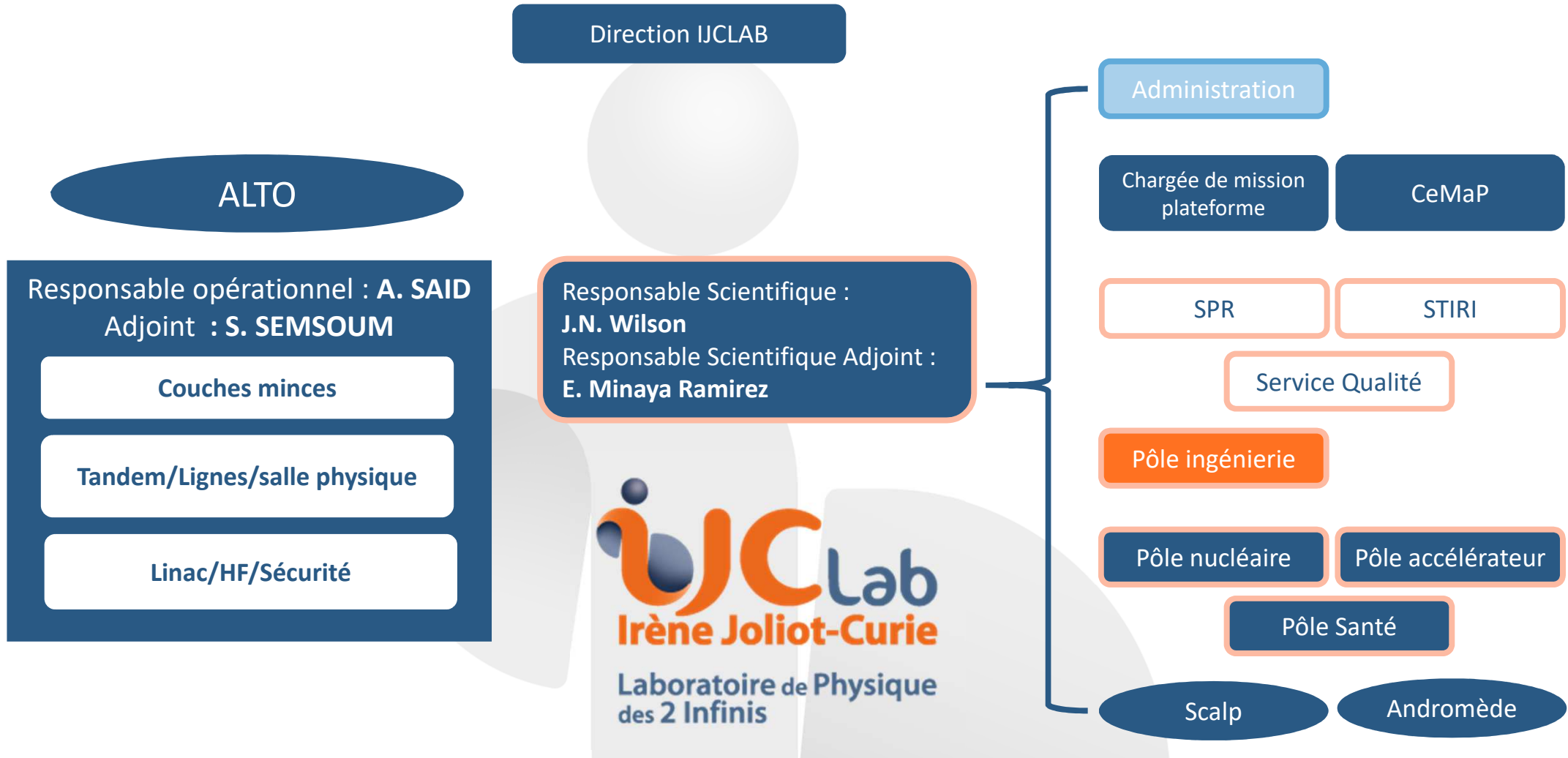


## Isol-France Meeting

Enrique Minaya Ramirez

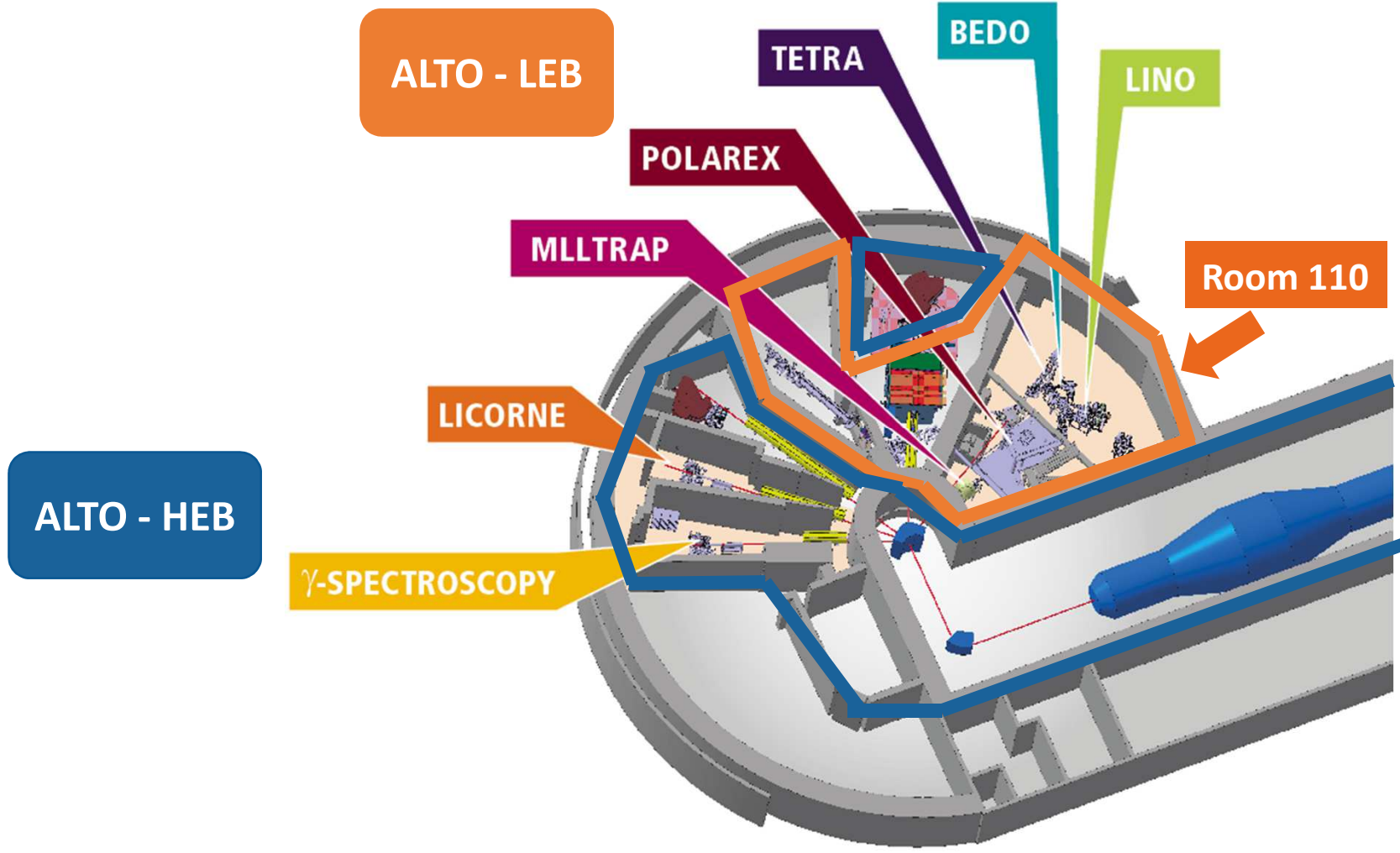


# IJCLab : Plateforme de recherche ALTO



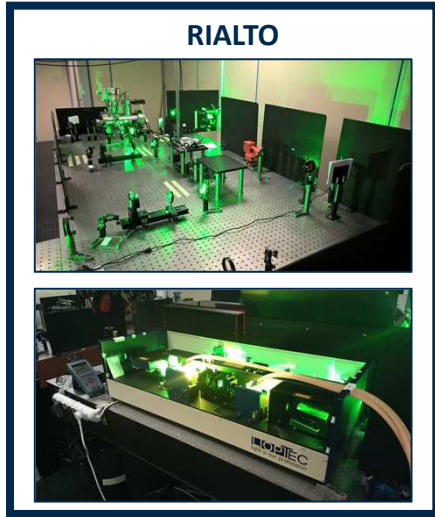


# ALTO : Accélérateur Linéaire et Tandem à Orsay





# ALTO-LEB



RIALTO

Observation

Production

Electron Linac  
50 MeV

Kicker-Bender  
(35°)

Target-ion  
source vault

Mass separator  
(magnet dipole)

RIB facility based on photo-fission  
→ populating the GDR of  $^{238}\text{U}$

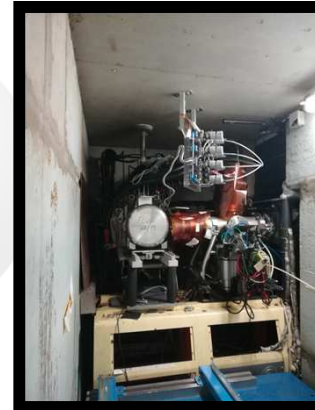
- 30 kV platform (→ 60 kV)
- mass separator ( $A/\Delta A = 1500$ )
- 10  $\mu\text{A}$ , 50 MeV e- beam
- $10^{11} - 4 \times 10^{11}$  fissions/s



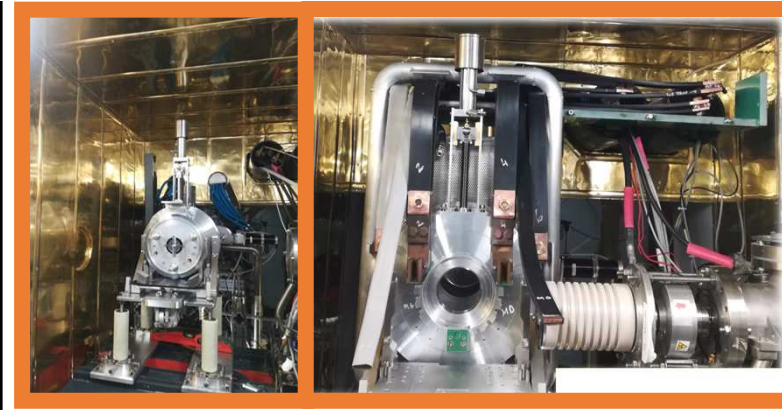
## FRISAL : Robotic Frontend for ALTO-LEB

### • Objectives of phase 1

- Increase Frontend reliability for RIB production
- Upgrade of the RIB acceleration from 30 kV to 60 kV
- New Frontend mechanics adapted to the “ECS Robot”



2019

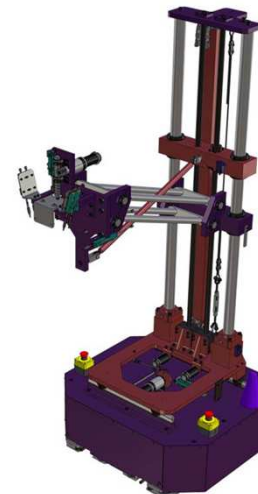
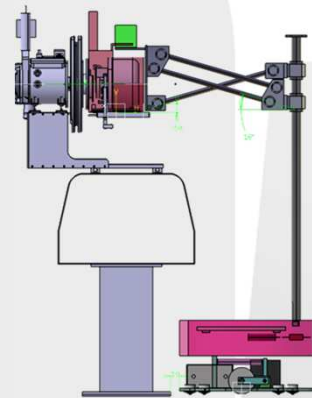


2020 / 2021

→ Online commissioning May-June 2021

### • Objectives of phase 2

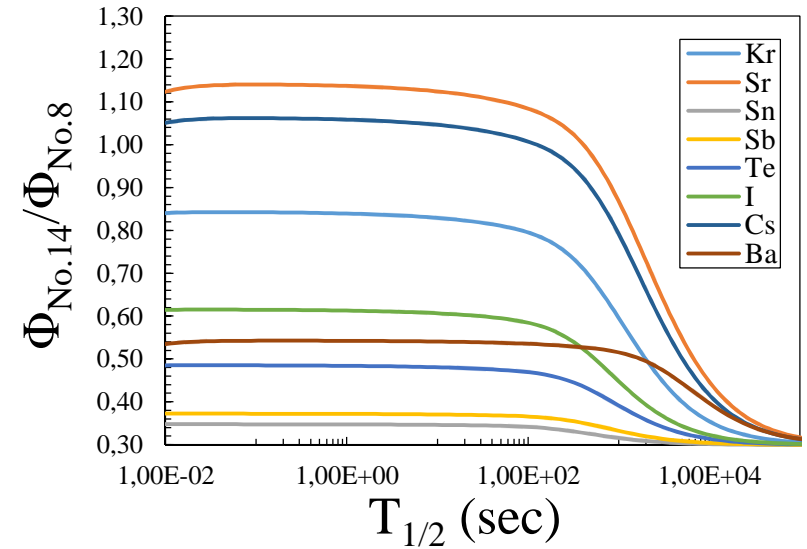
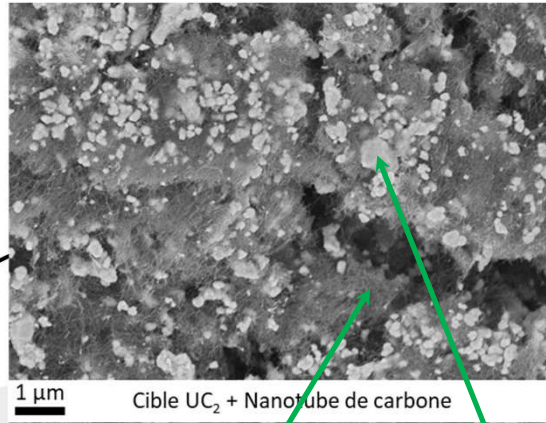
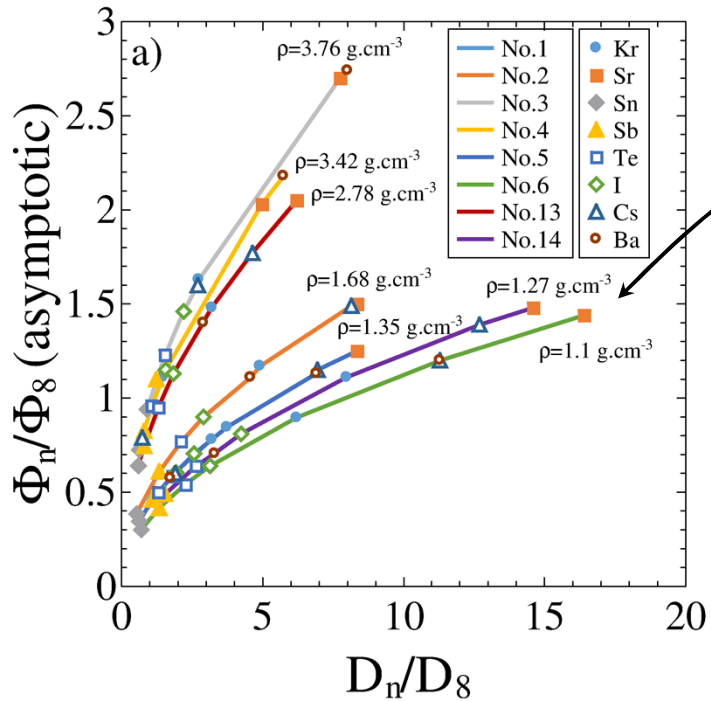
- Implementation of the “ECS robot”
- Increase the number of RIB experiments





# Influence of density and release properties of UCx targets on the fission product yields at ALTO

ALTO - LEB



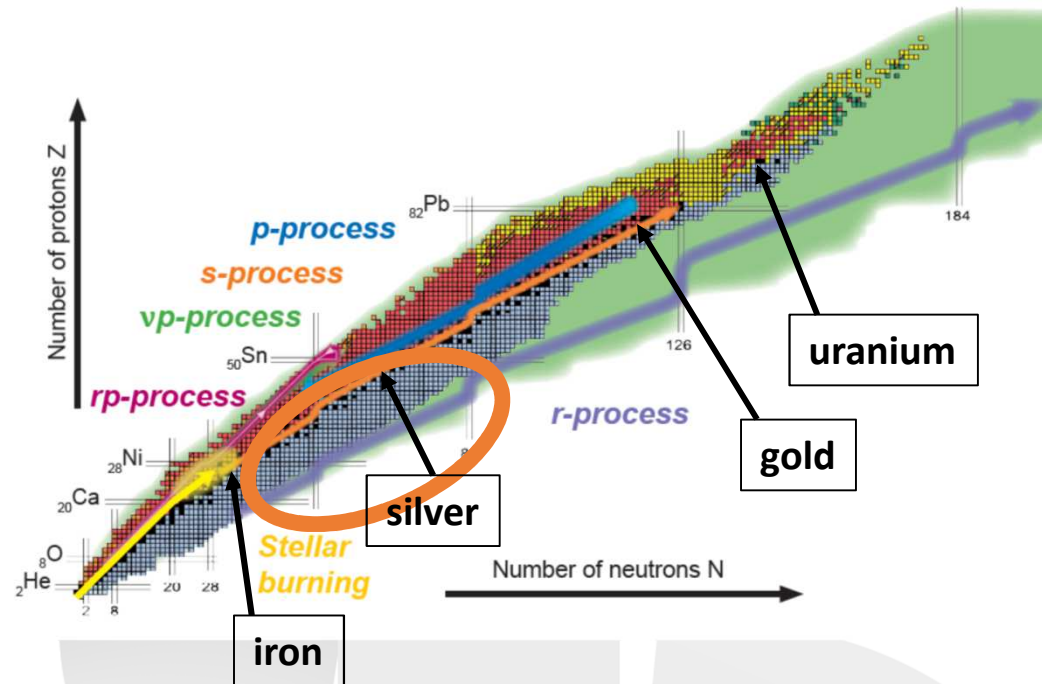
→ The new target CNT-based is 3 times less dense than a conventional PARRNe target. For Sr, Cs and Kr the R&D target compensates its low density by a more efficient release.

Exit rates of Kr, Sr, Sn, Sb, Te, I, Cs and Ba isotopes with half-life less than 100 seconds from targets Nos. 1 to 14 relatively to the target No. 8 as a function of the ratio of the diffusion coefficient in the target  $n$  over the diffusion coefficient in the conventional target.  
a) representation of the samples only carburized

*J. Guillot, B. Roussiere et al., Nucl. Instrum. Meth. B, vol. 468 (2020) 1–7*



## ALTO-LEB : Observation (Room 110)



**Nuclear structure studies → currently 6 projects expected at ALTO-LEB**

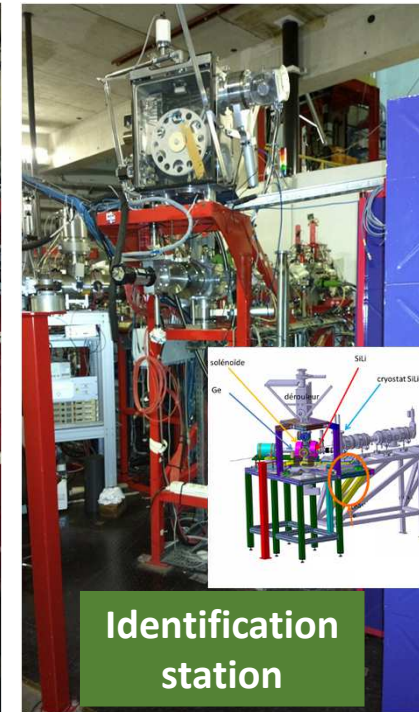
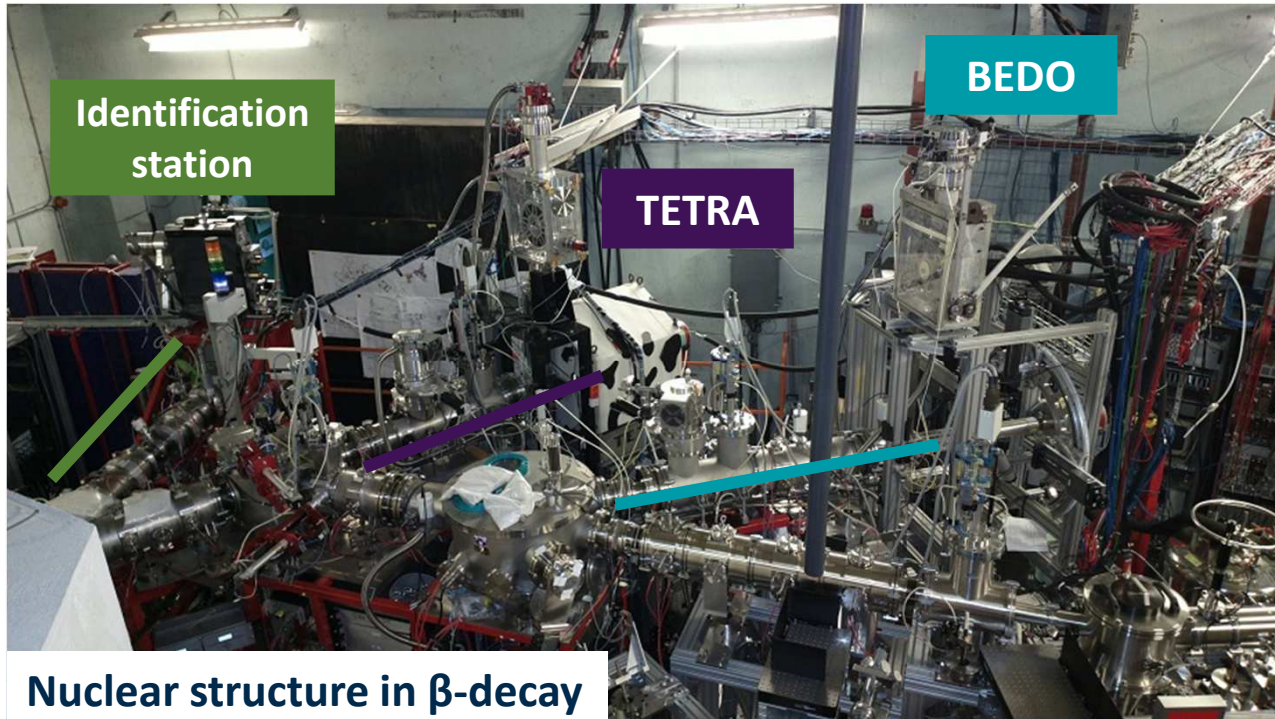
- They will/allow measuring nuclear fundamental properties of ground and long-lived isomeric states.
- Access to fundamental observables to test state-of-the art nuclear theories [ $I$ ,  $\mu$ ,  $Q_s$ ,  $\delta\langle r^2 \rangle$ ,  $B(N,Z)$ ,  $\beta$  decay spectroscopy]







## ALTO-LEB : Observation (Room 110) - MP BESTIOL



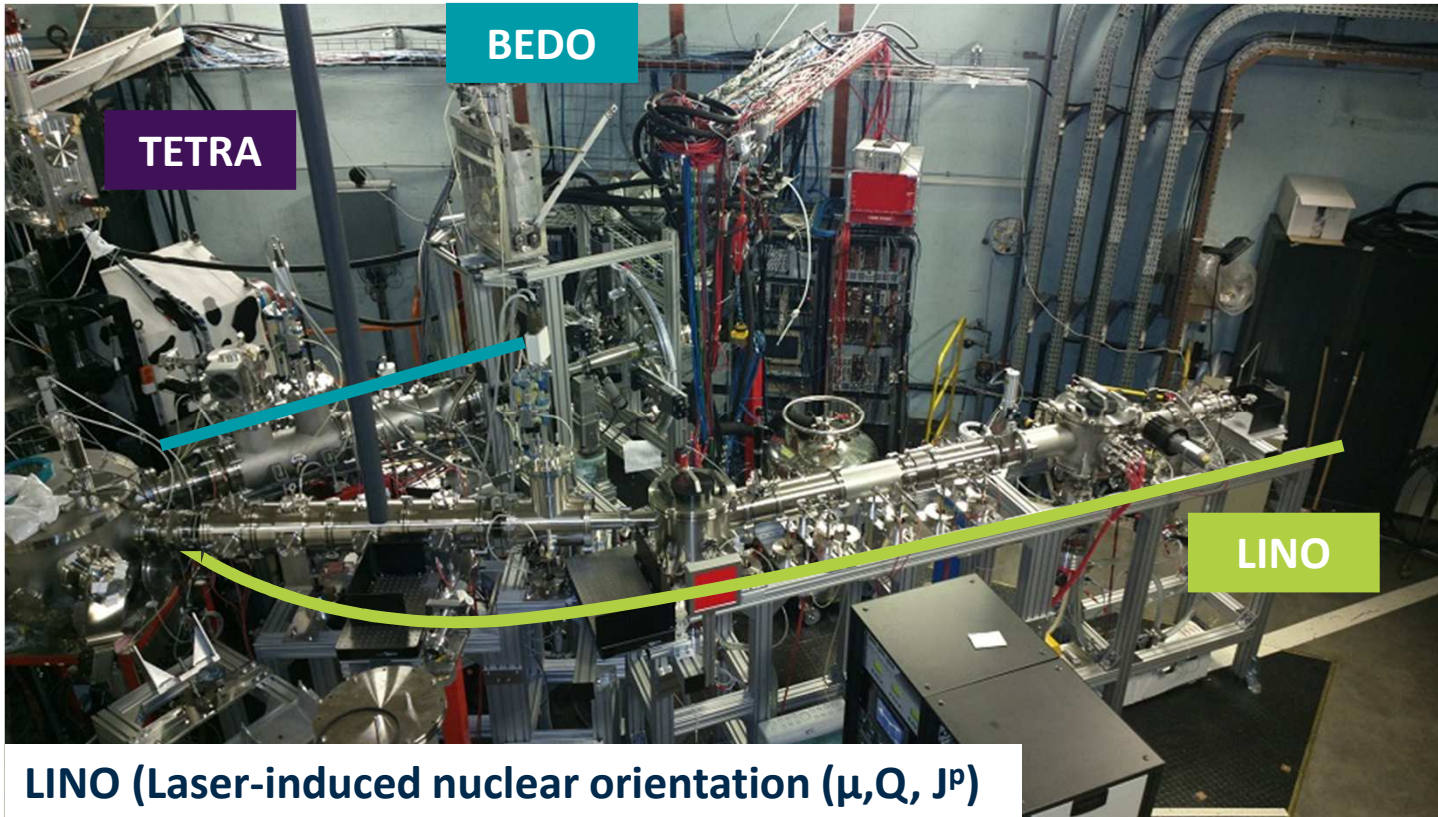
PARRNe : identification station / conversion electron spectroscopy (**COeCO** : COnvergent Electron Chaser in Orsay)

TETRA : neutron detection / 80  $^3\text{He}$  tubes  $\epsilon(^{252}\text{Cf}) = 53\%$  borated polyethylene shielding

BEDO : (**BE**tta **D**ecay studies in **O**rsay) / up to 5 Ge detectors ( $\epsilon = 5\text{-}6\%$ )  $4\pi$   $\beta$  trigger /Fast-timing studies using  $\text{LaBr}_3$  detectors

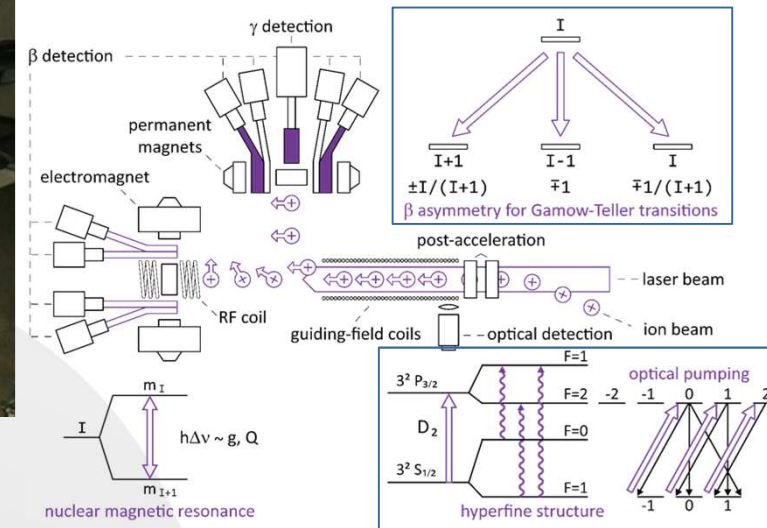


# ALTO-LEB : Observation (Room 110) - MP LUMIERE



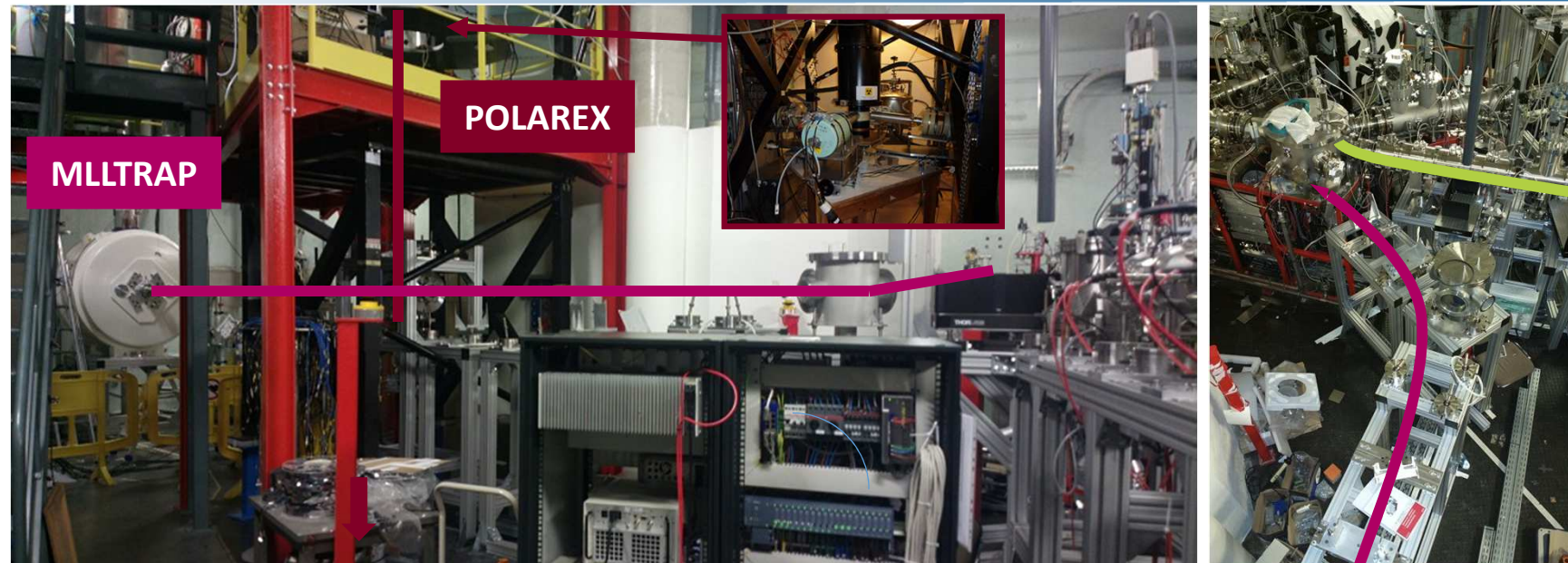
## LINO (Laser-induced nuclear orientation ( $\mu, Q, J^P$ ))

- polarization by optical pumping
- $\mu$  &  $Q$  from nuclear magnetic resonance
- $\beta$ -delayed spectroscopy of laser-polarized beams





## ALTO-LEB : Observation (Room 110) – MP POLAREX / MP DETRAP



**POLAREX (POLARized EXotic nuclei )** → nuclear magnetic moments, ground-state spins, fundamental interactions ( $\beta$ -asymmetry and isospin mixing)

The On-Line Nuclear Orientation (OLNO) method combines the on-line implantation of radioactive beam of interest with the Low-Temperature Nuclear Orientation (LTNO) technique. The polarization, needed to get a spin-oriented system, is induced by on-line implantation of the exotic nuclei on a ferromagnetic host foil held at a temperature of the order of 10 mK attached to the cold finger of an  $^3\text{He}$ - $^4\text{He}$  dilution refrigerator.

**MLLTRAP** → High-precision mass measurements with Penning traps



## ALTO-LEB : current timeline

**MP BESTIOL**

→ on-line commissioning of COeCO with Ga (Q2 2021) /  
molecular beams (lanthanide molecular ion beams by fluorination technique, Q4 2021)

**MP POLAREX**

→ on-line commissioning of POLAREX with molecular beams (2021)

**MP LUMIERE**

→ on-line commissioning of LINO with silver beams (2022)

**MP DETRAP**

→ on-line commissioning of MLLTRAP with silver beams (2022)