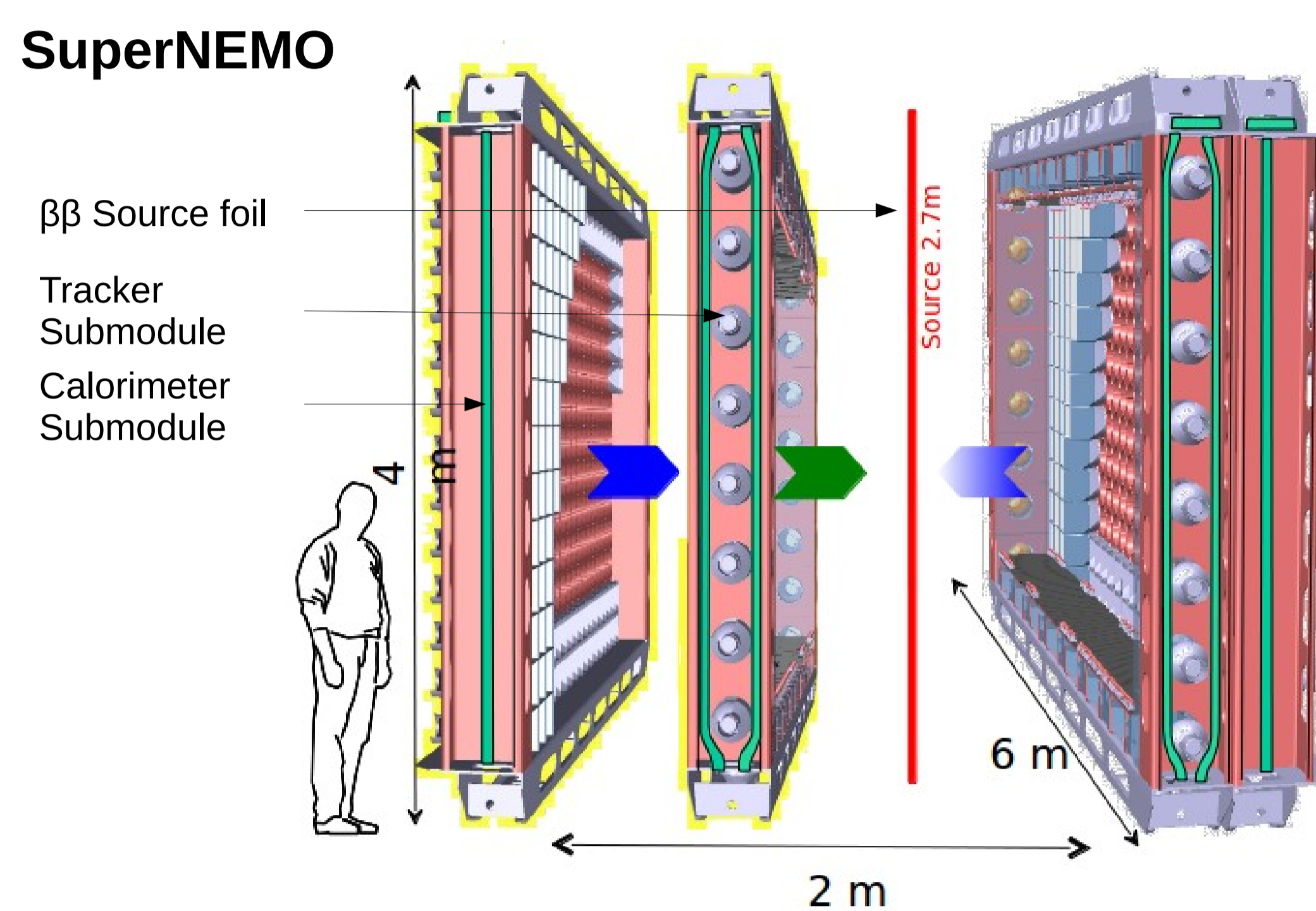
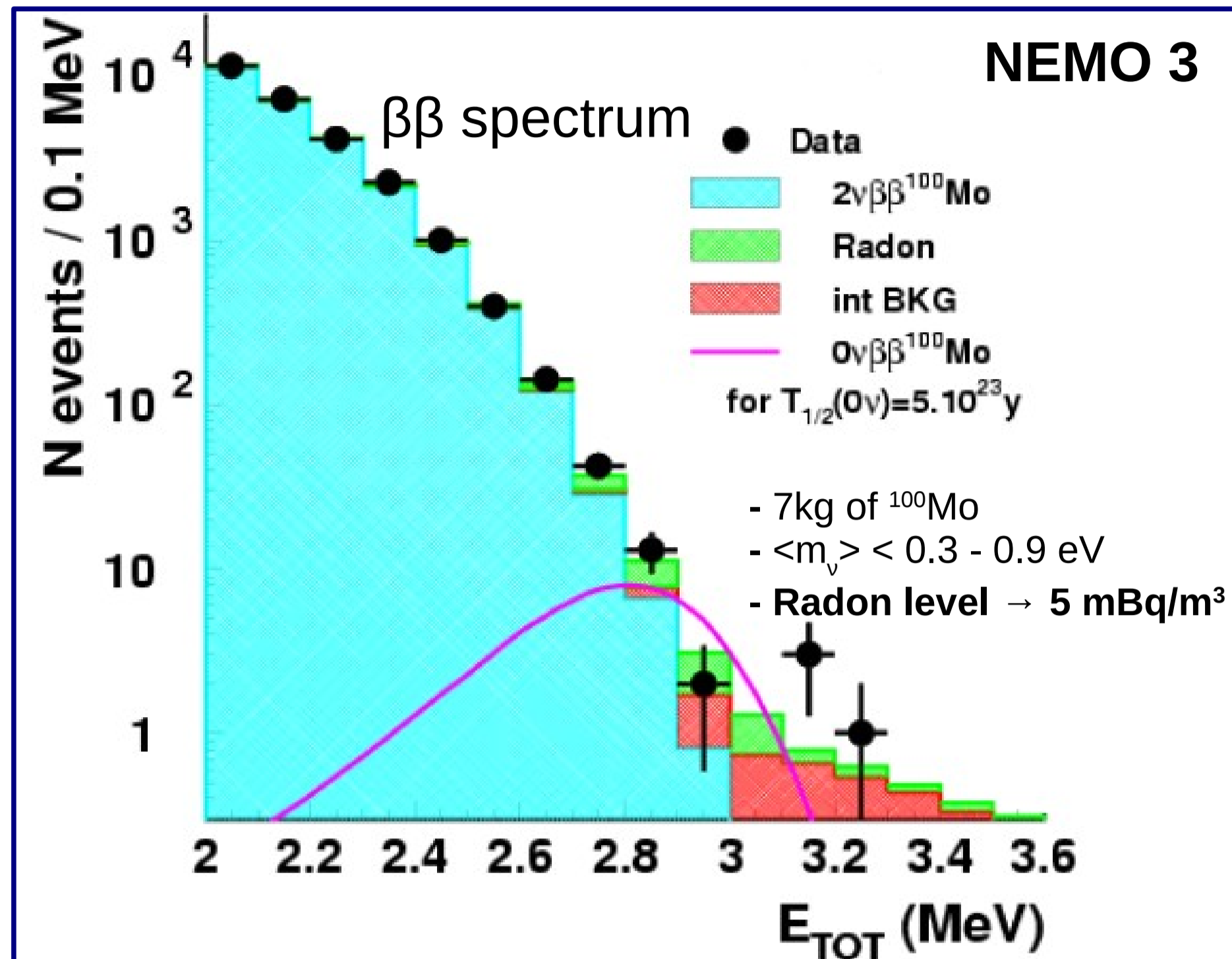


## SuperNEMO demonstrator requirements



- Tracko-Calo detector searching for  $\beta\beta 0\nu$
- 7kg of  $^{82}\text{Se}$  (for the 1<sup>st</sup> module)
- Sensitivity (for 22 modules)  $\rightarrow \langle m_{\nu} \rangle < 0.04 - 0.11 \text{ eV}$
- Rn level required  $\rightarrow 0.15 \text{ mBq/m}^3$

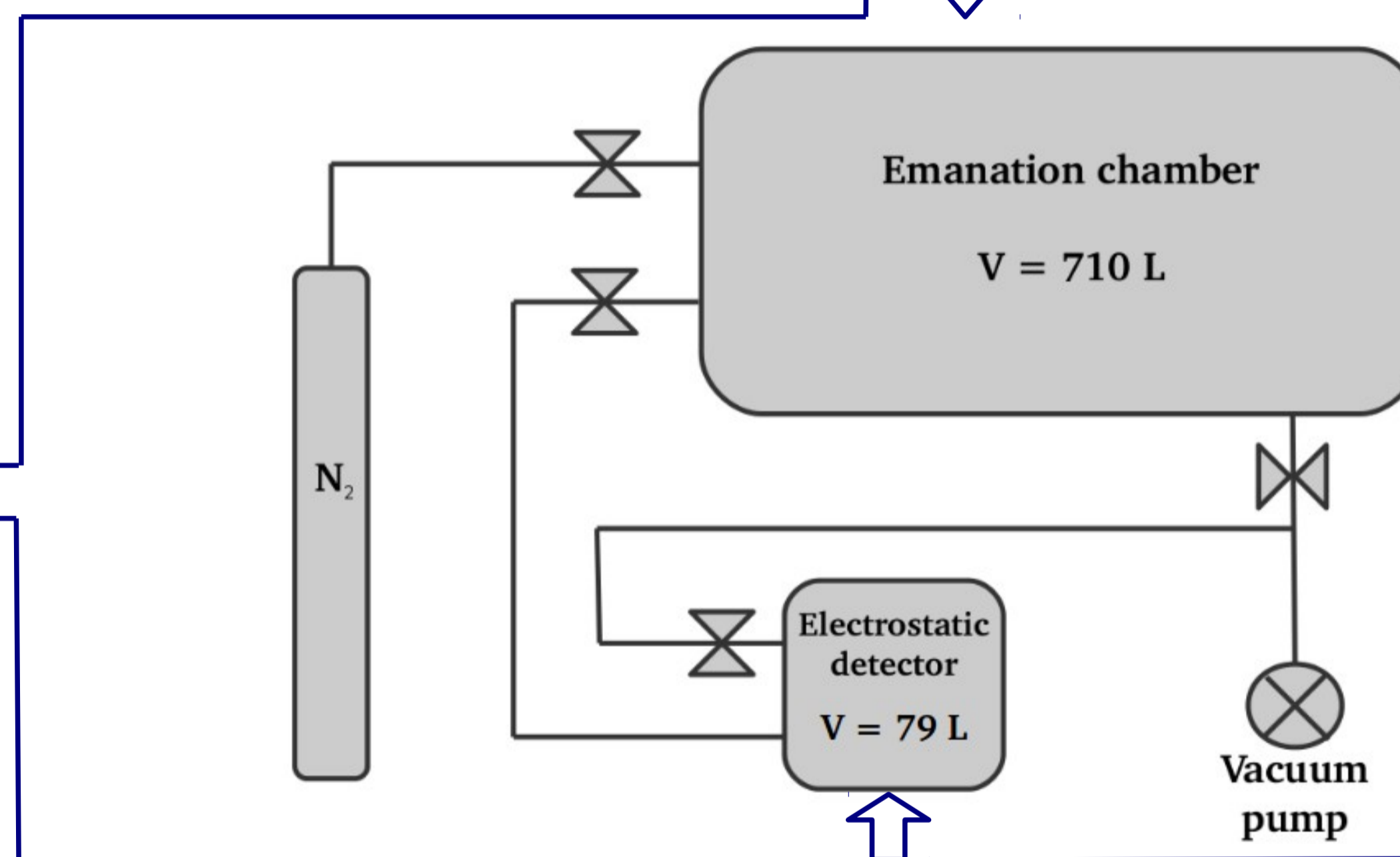
$< 1200$  Radon atoms emanating inside the detector chamber

**Need of a setup for measuring large samples / number of samples emanation**

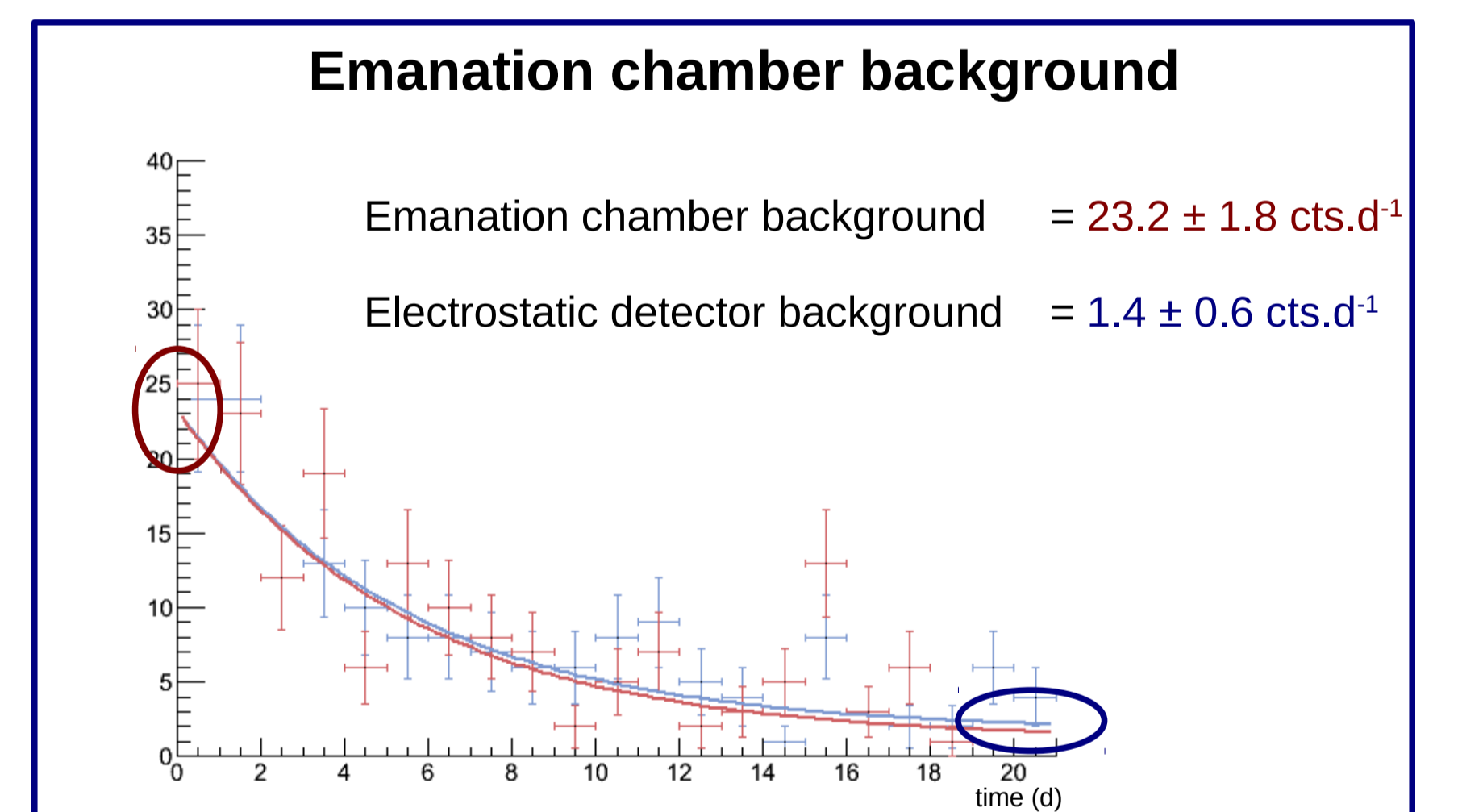
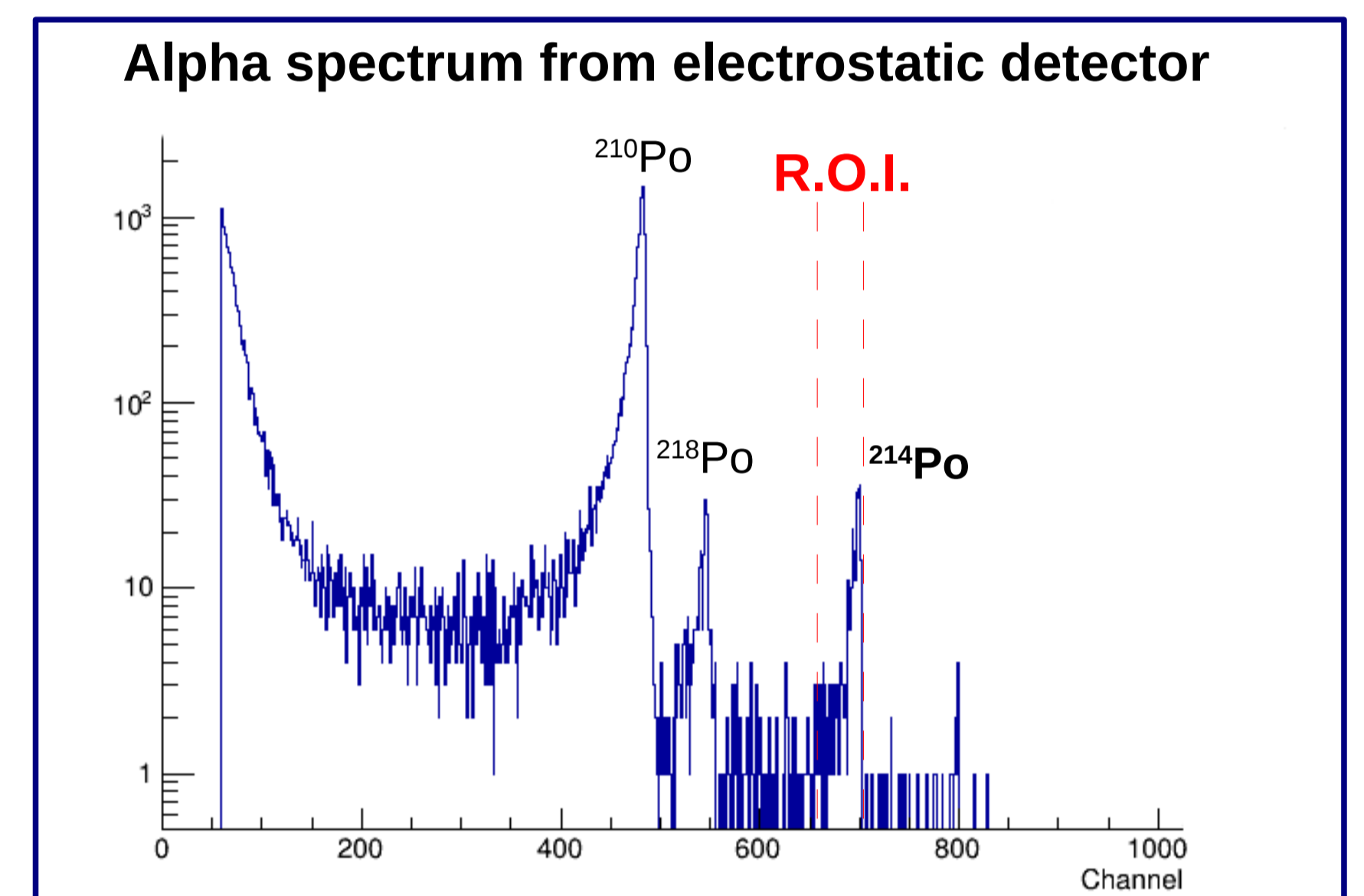
## Emanation setup for large samples measurements



- Huge volume  $\rightarrow \sim 710 \text{ L}$
- Suited for low pressure  $\rightarrow 10^{-1} \text{ atm}$
- Low Radon emanation
- Made of stainless steel (Radiopure)

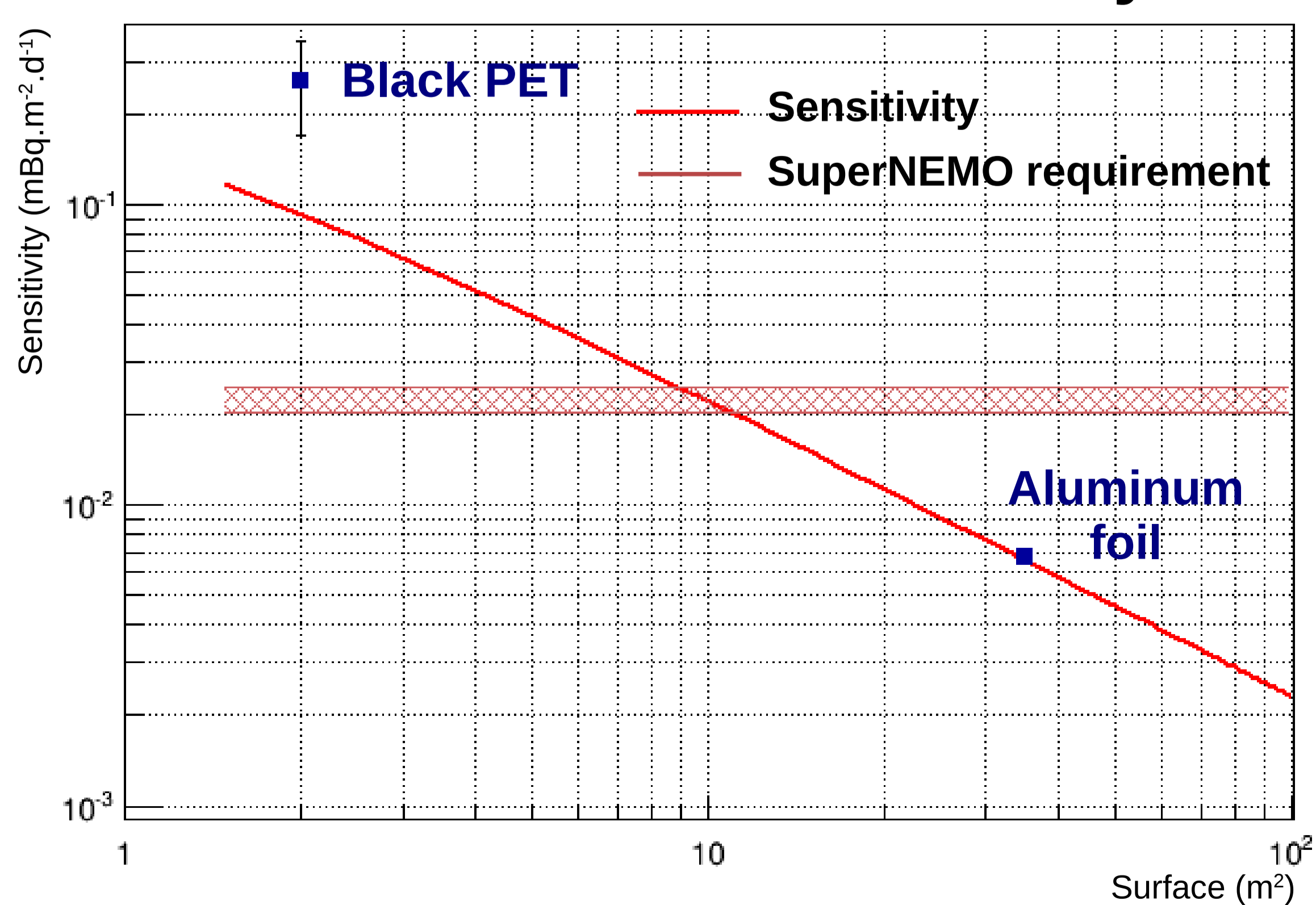


- Air tight volume  $\rightarrow \sim 79 \text{ L}$
- Radon daughters collected on a Si PIN Diode with a -1500 V high voltage
- $\alpha$  spectrometry  $\rightarrow$  identification of the  $\alpha$  emitter
- Low Radon emanation  $\rightarrow$  good sensitivity
- Efficiency  $\rightarrow \sim 35 \%$



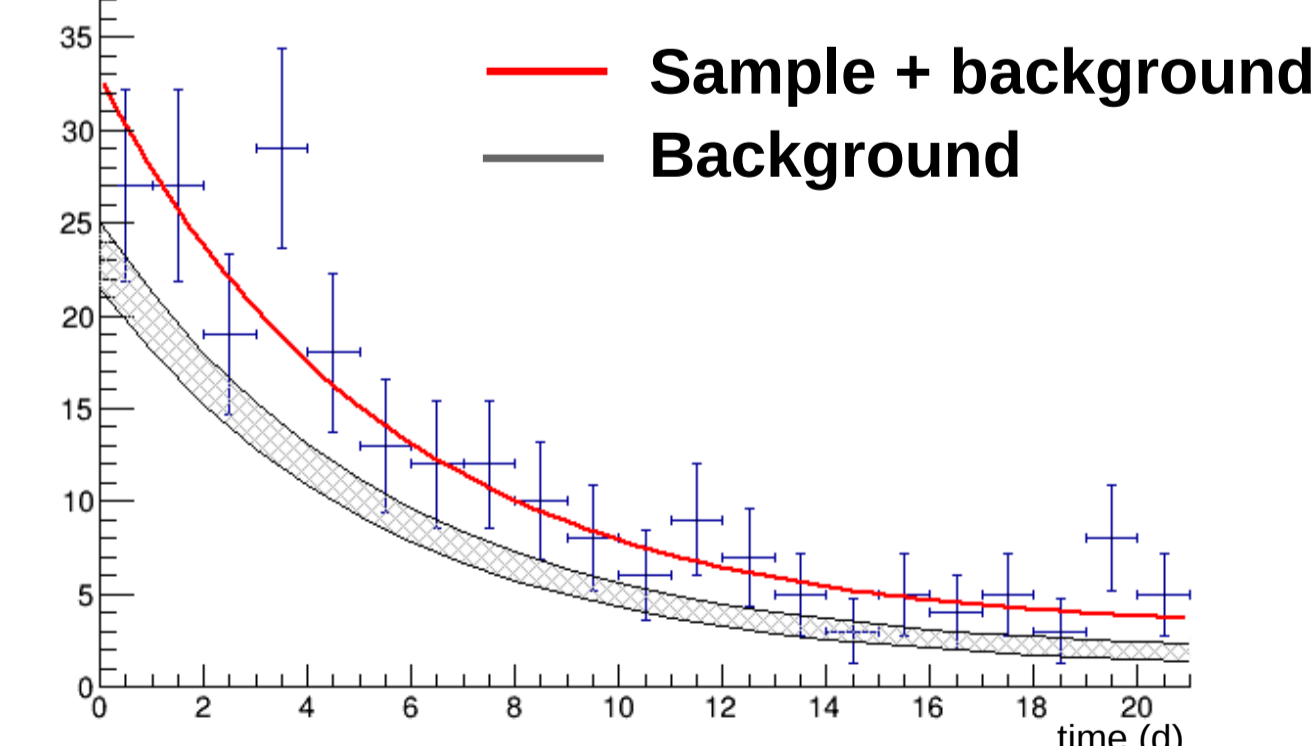
## High Sensitivity

### Rn emanation Sensitivity



## Rn emanation measurements

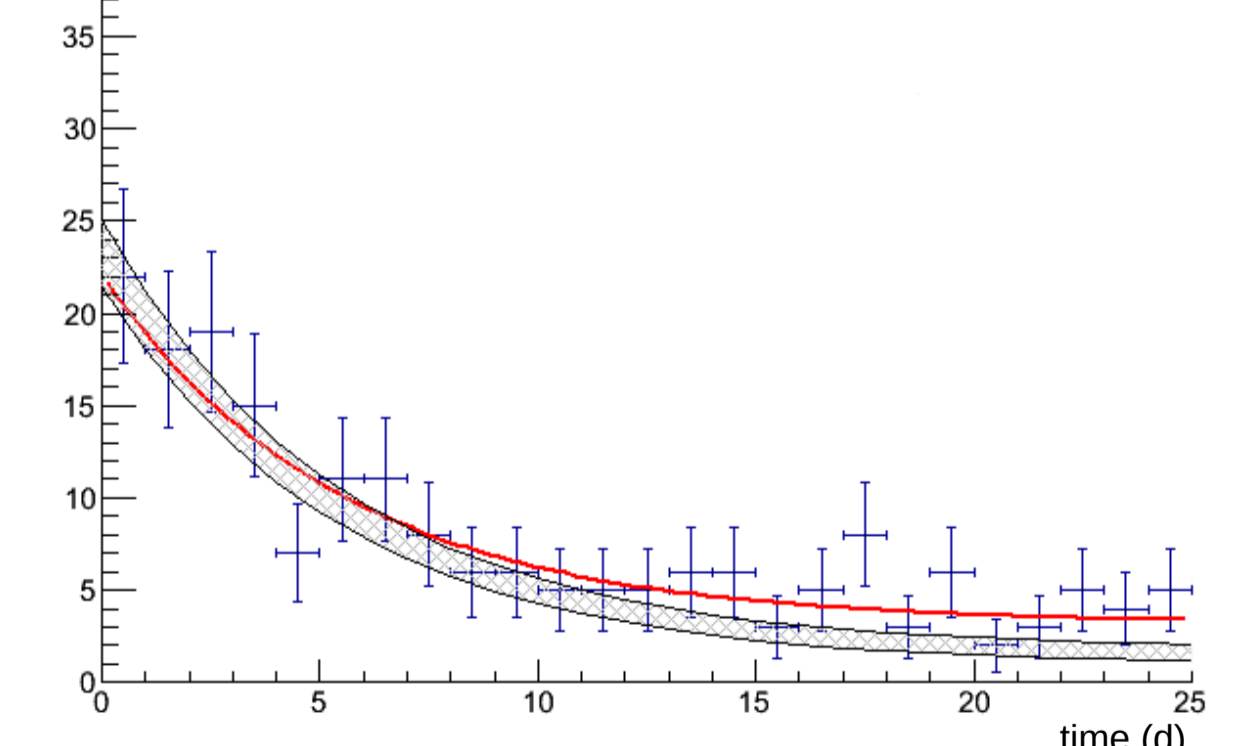
### Black Polyethylene (2 m<sup>2</sup>)



- Emanation =  $0.26 \pm 0.09 \text{ mBq.m}^2.\text{d}^{-1}$

- HPGe measurement confirmed  
 Ra contamination ( $A = 10\text{-}40 \text{ mBq.kg}^{-1}$ )

### Aluminium foil (35 m<sup>2</sup>)



- Emanation  $< 6.7 \mu\text{Bq.m}^2.\text{d}^{-1}$

- HPGe measurement confirmed  
 ( $A < 45 \text{ mBq.kg}^{-1}$ )

**A new setup for measuring the emanation of large samples (or a large amount of samples) is now available at CENBG.**

This system is complementary to the HPGe detectors (used for radiopurity measurements) for the screening of the SuperNEMO demonstrator materials.