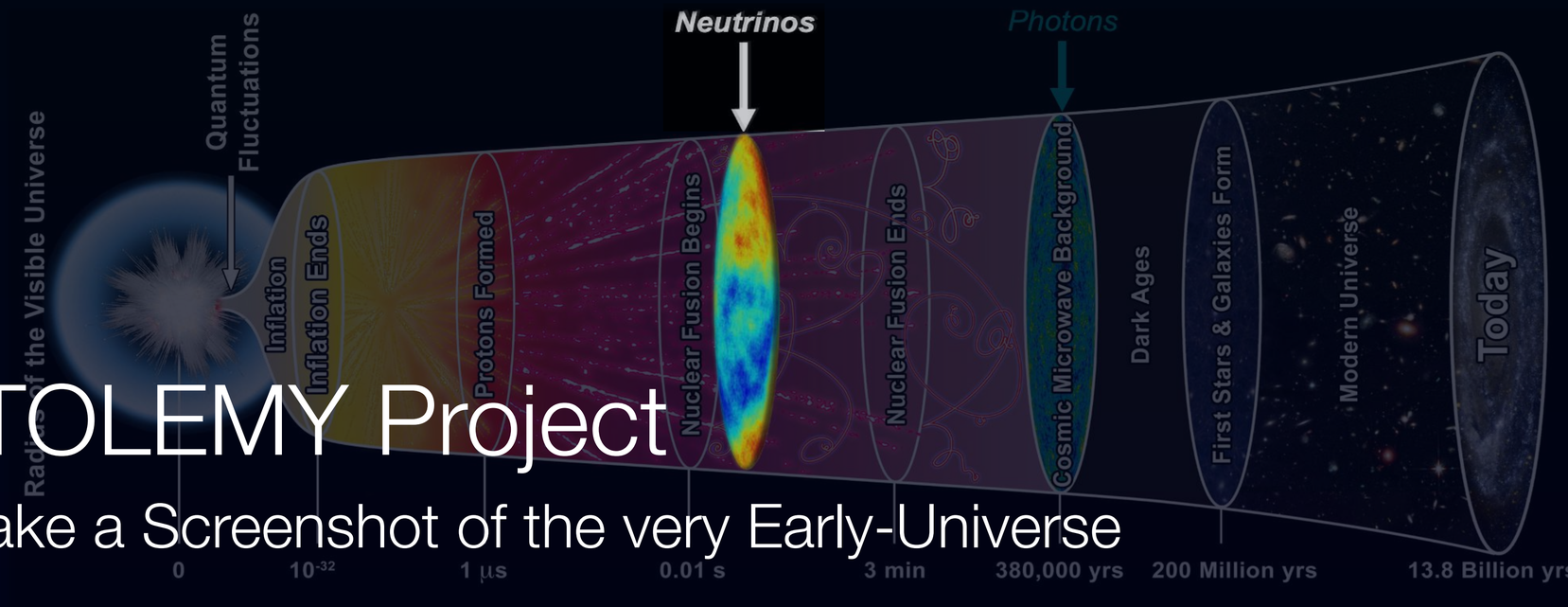


The PTOLEMY Project

How to Make a Screenshot of the very Early-Universe

GRAN SASSO SCIENCE INSTITUTE

INFN LNGS

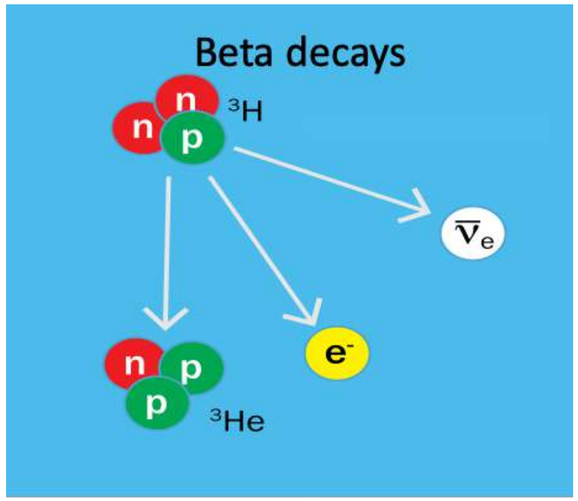
Presentation for GSSI Astroparticle Science Fair, 24 February 2025

Francesca Maria Pofi on behalf of the PTOLEMY Collaboration

PTOLEMY

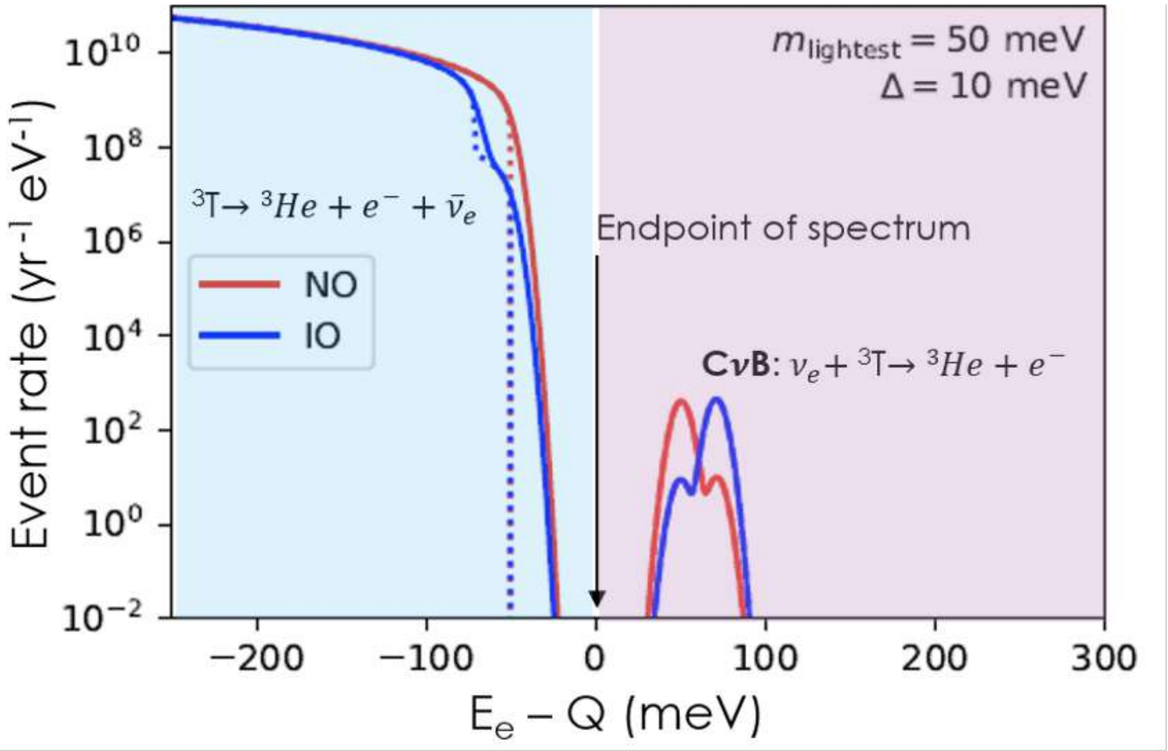
Detection concept: Neutrino Capture

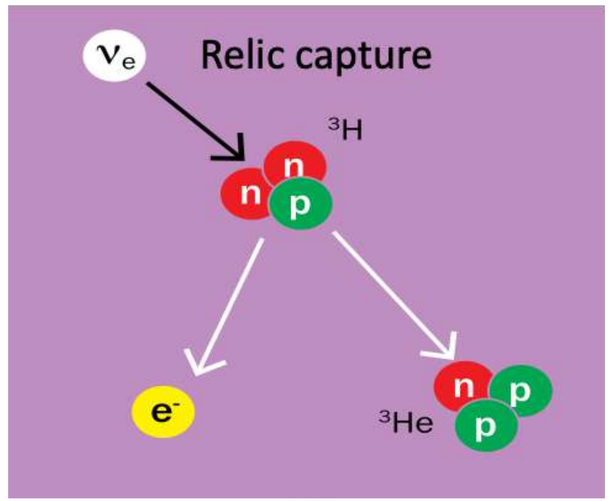
☑ Let's take a β-unstable nucleus eg Tritium (^{3}H) → What we can get?



Neutrino mass measurement from endpoint distortion

(1st goal)





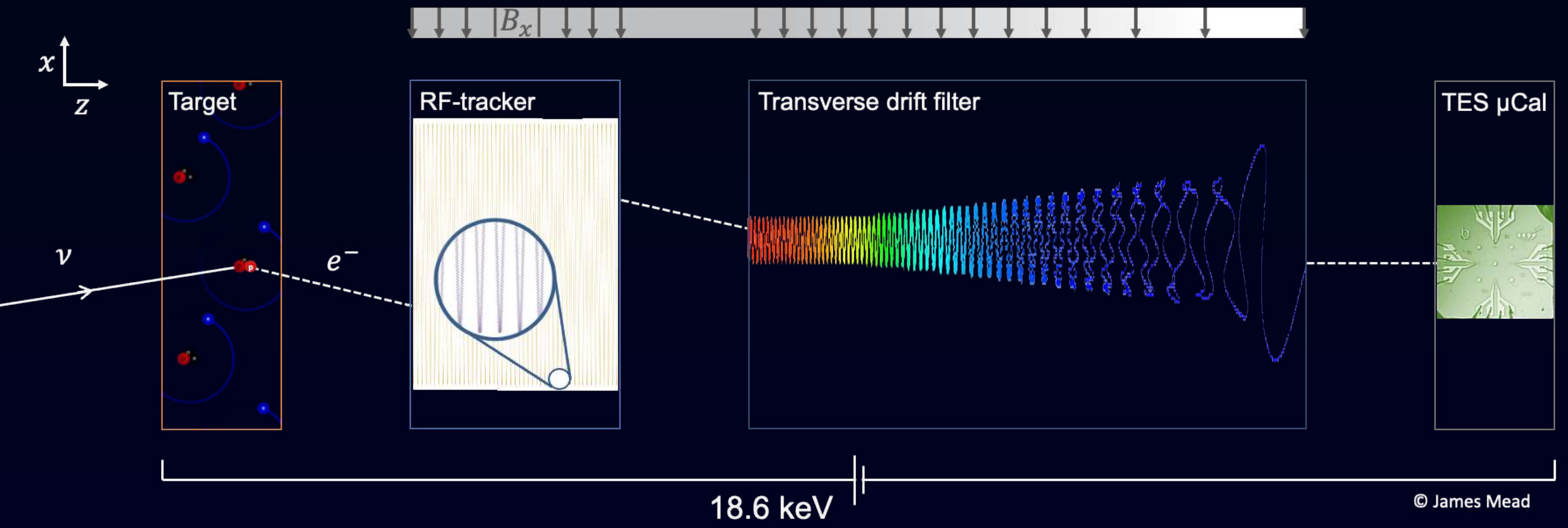
First detection of Cosmic Neutrino Background

(Final goal)

A Cross-Disciplinary Detector

PTOLEMY

Pon**T**ecorvo / **P**rince**T**on **O**bservatory for **L**ight **E**arly-universe **M**assive-neutrino **Y**ield



$$E_{total} = q(V_{TES} - V_{target}) + E_{RF} + E_{cal}$$

Demonstrator @ LNGS

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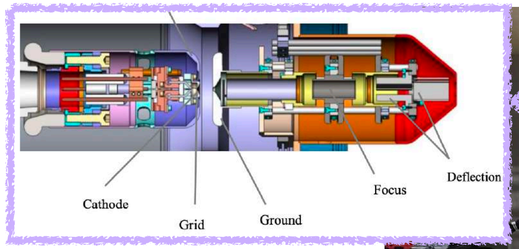
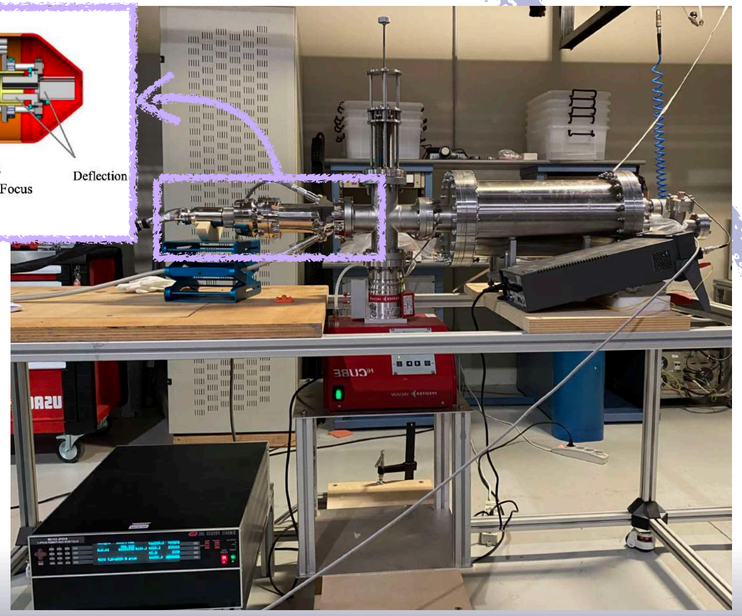
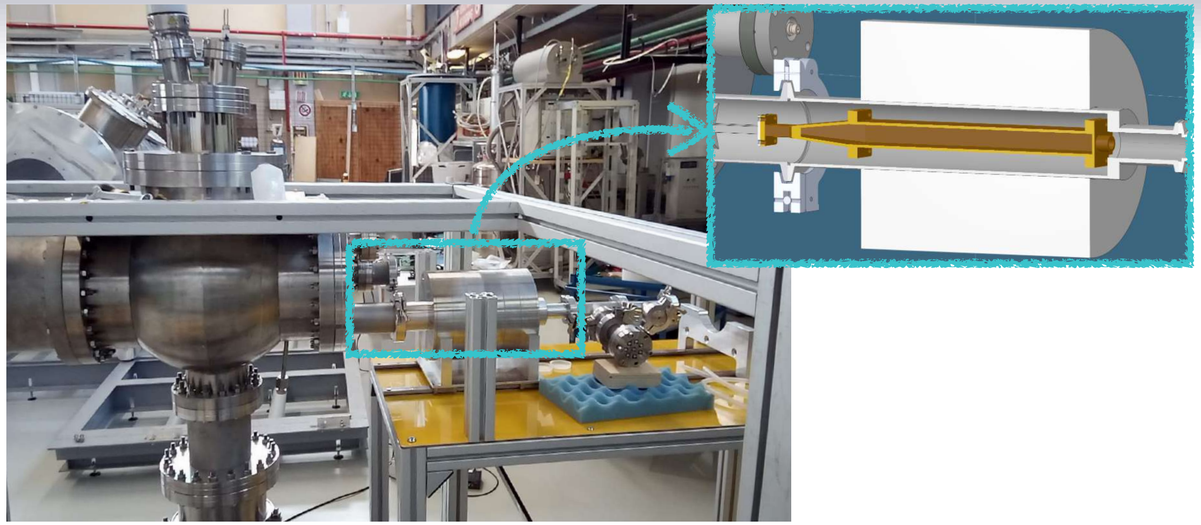
☑ RF detection setup with ^{83m}Kr injection

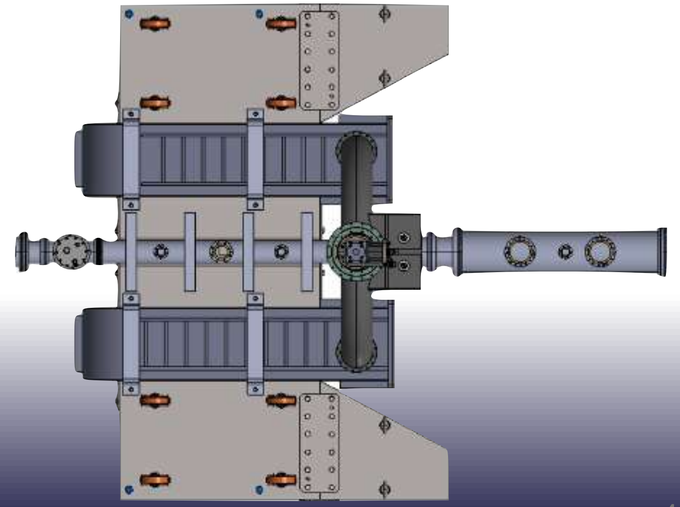






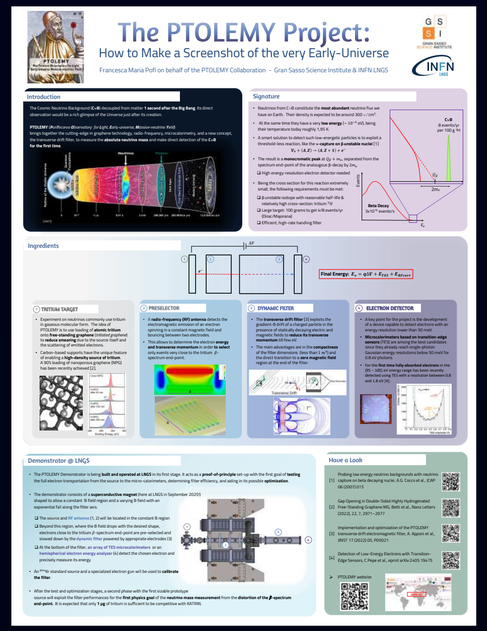
☑ Electron gun setup for calibration

☐ Magnet for transverse drift filter *arriving in Sep 2025!*



To Recap

- RF radiation detection, filter calibration setup & neutrino mass sensitivity studies *ongoing @ LNGS*
- Demonstrator under construction *from this year @ LNGS*
- First Goal: Neutrino Mass Measurement
  Final Goal: CvB Detection
- To know more come to visit us @ our poster!



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- Nicola Rossi
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