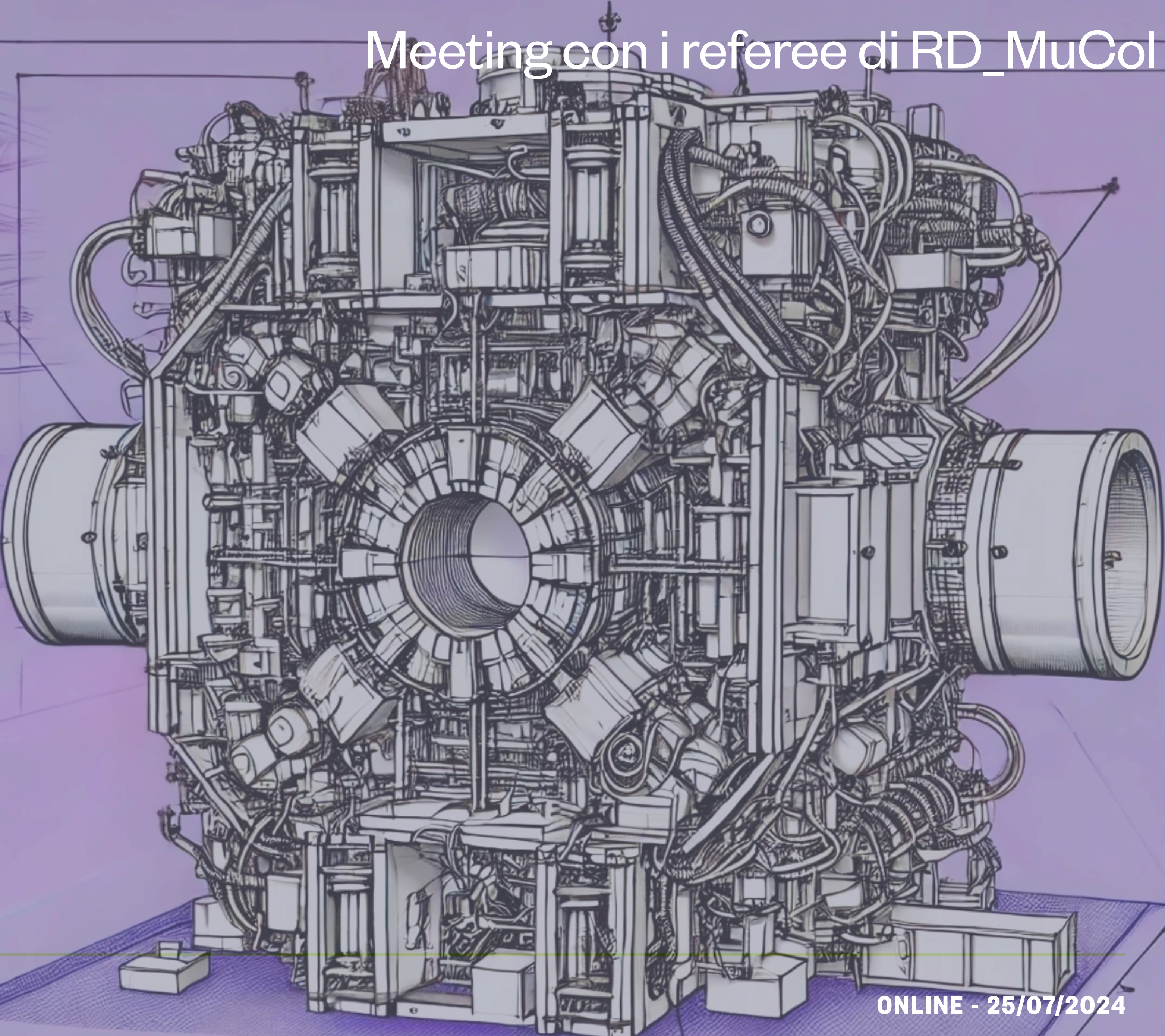


HCAL Crilin-like

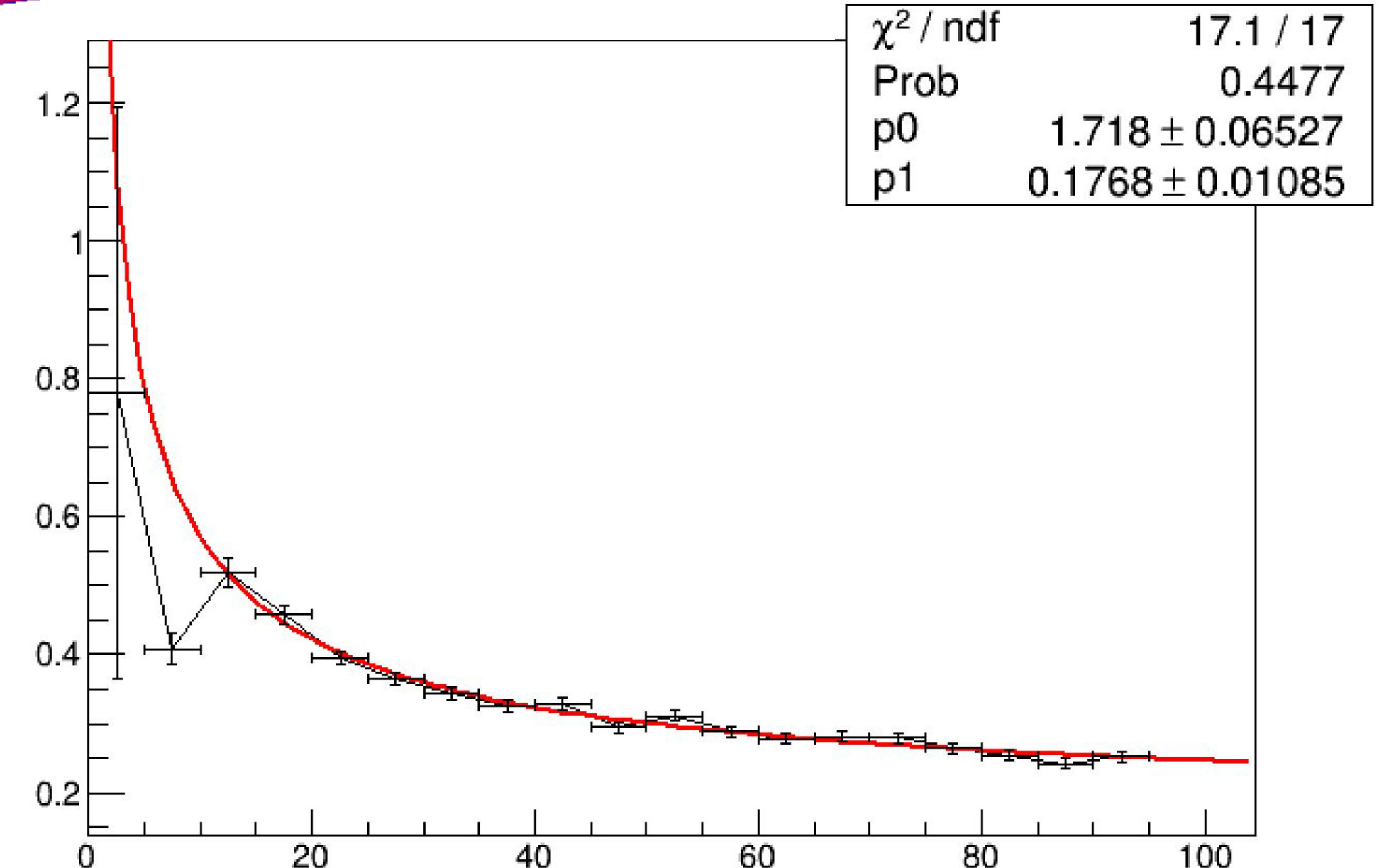
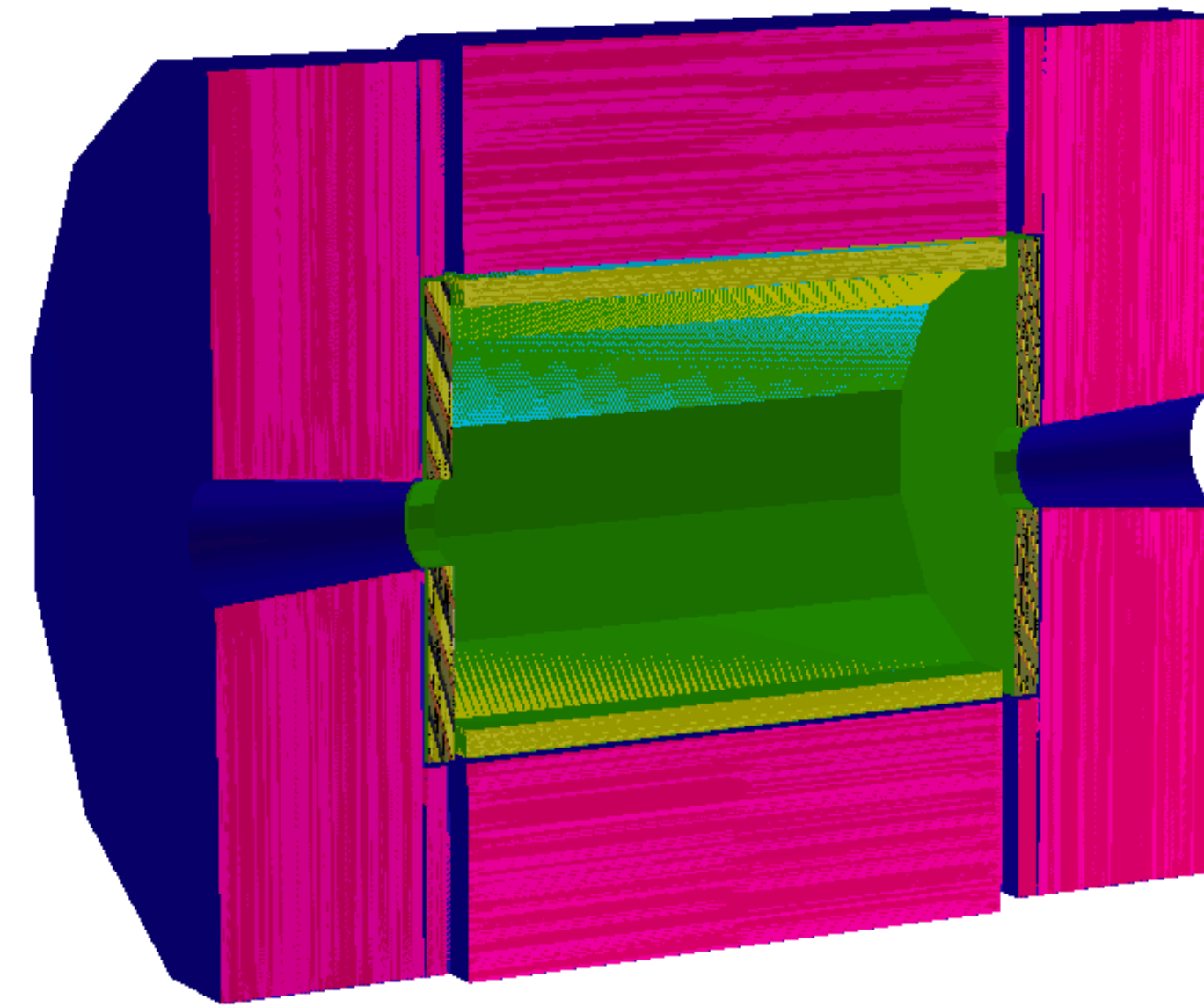
MASSIMO CASARSA¹, IVANO SARRA²,
LORENZO SESTINI³, **DAVIDE ZULIANI^{3,4}**



Actual HCAL

Where we stand

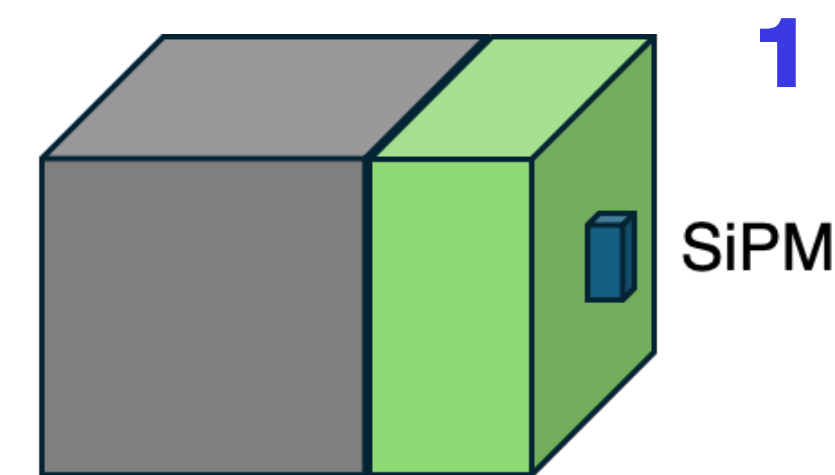
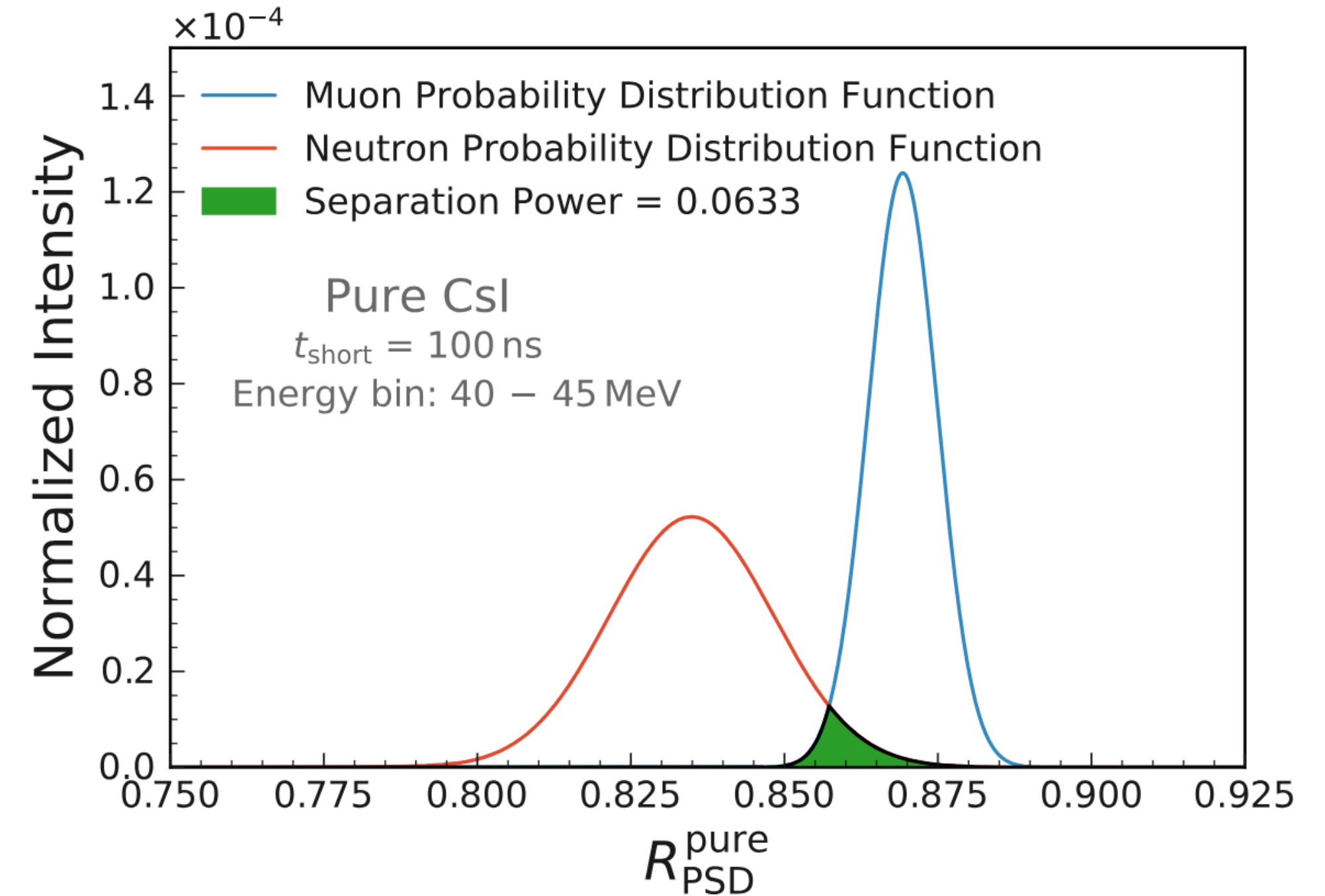
- So far, using HCAL from CLD detector
- Not so many performance studies on this
 - Jets are built using Pandora PFA, therefore combinations of tracks and clusters
- Quick study with simulations using single pions
 - Energy from 1 to 100 GeV
 - Here only barrel region considered
- Pandora PFA optimisation taken from CLIC studies
- Huge spread in correction factors
 - Better calibration is needed
- Performance is not so decent



HCAL Crilin-like

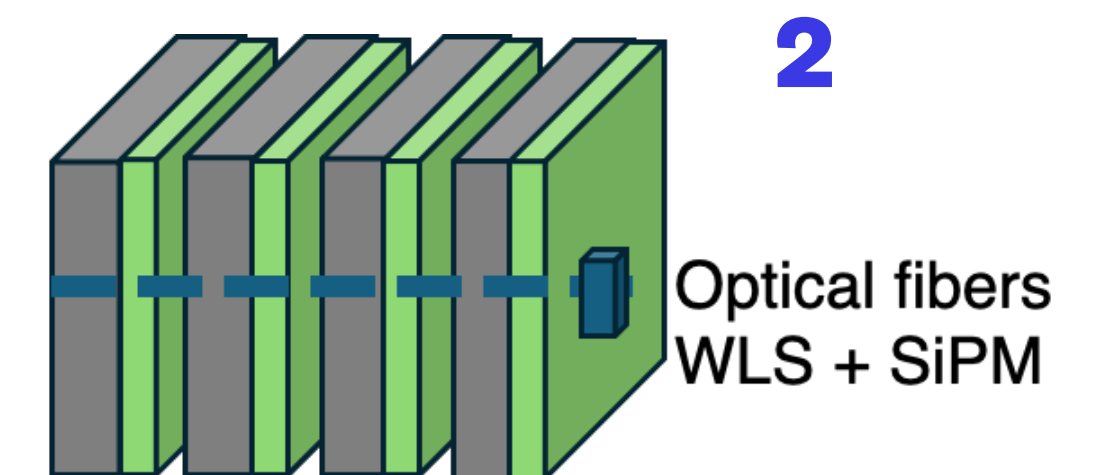
Exploit experience with Crilin

- As explained by Ivano, great experience in these latest years with Crilin concept
 - Simulations and test-beams
- **Idea: develop a HCAL with a similar structure as Crilin ECAL**
- Start from the measurement studied [here](#)
 - Using pure CsI crystals, in a time window of 100 ns it is possible to discriminate 80% of MIP muons w.r.t. neutrons at 100 MeV
- 2 possible choices for HCAL:
 1. Lower segmentation
 2. Higher segmentation



1 layer of

- 6x6x6 cm³ Steel
- 4x6x6 cm³ CsI puro



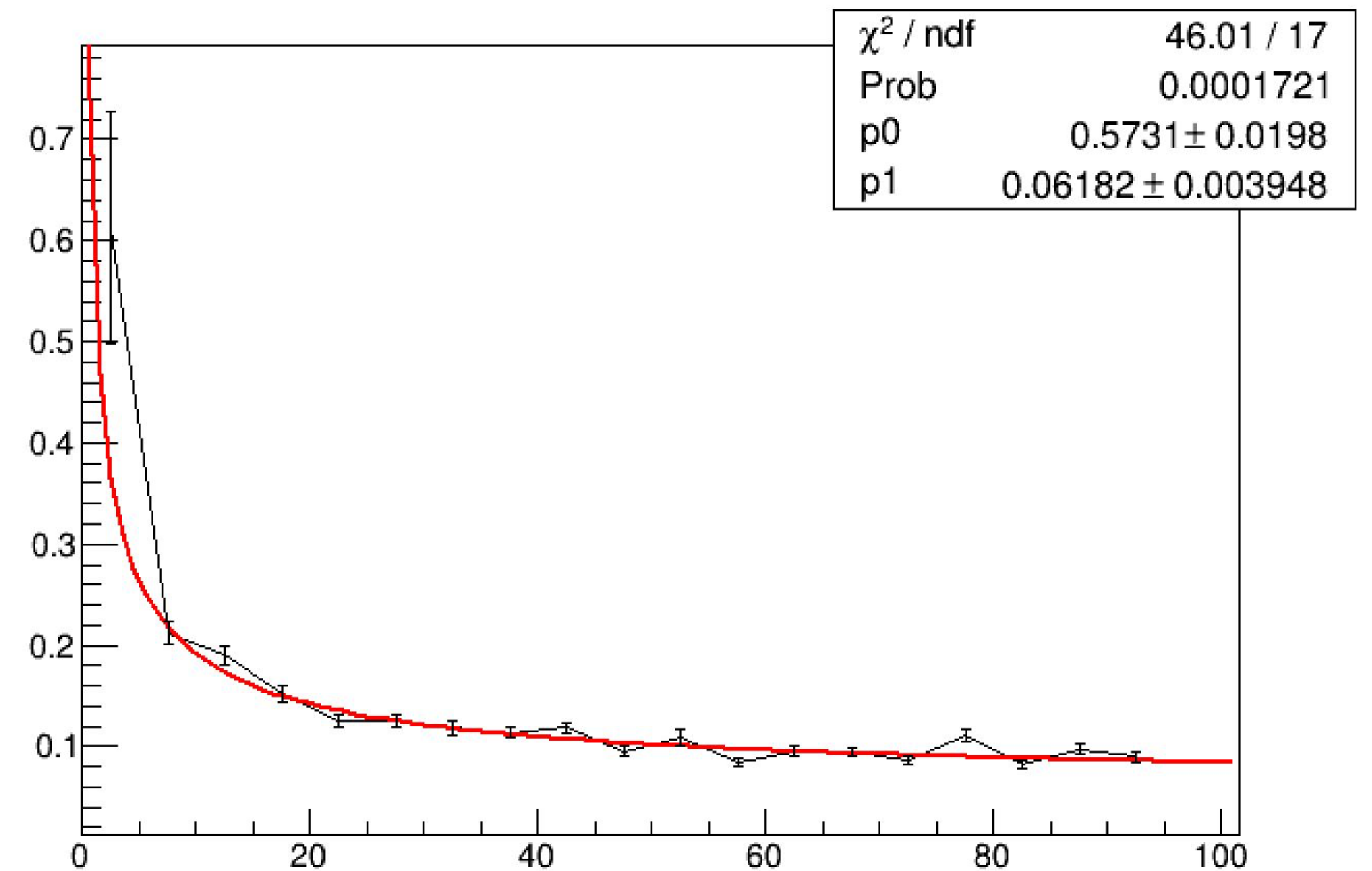
4 layer of

- 1.5x6x6 cm³ Steel
- 1x6x6 cm³ CsI puro

HCAL Crilin-like - simulations

Quick study

- A quick study with simulations has been performed
- Choice 1 of HCAL Crilin-like (lower segmentation) has been placed in **full detailed Muon Collider** simulations (similar to slide 2)
- Pandora PFA not optimised for this new geometry
- Already at this (non-)level of optimisation **better results w.r.t. standard HCAL**
- Huge room for improvement



HCAL Crilin-like - request

What we would need

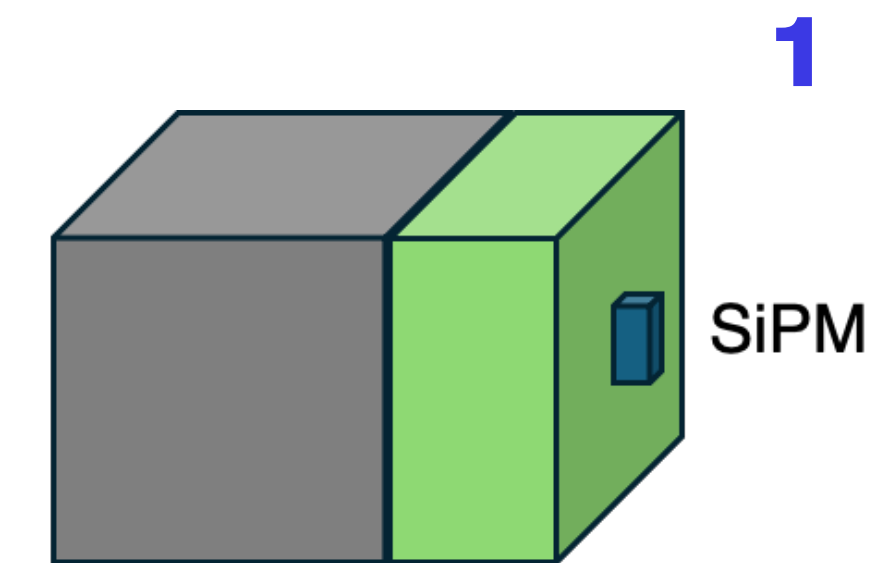
- We would like to **build and test a prototype of HCAL**:

- Build one cell ($\sim 1 \lambda$)
- Tests at test-beams (SPS, ...)
- Measure compensation capability

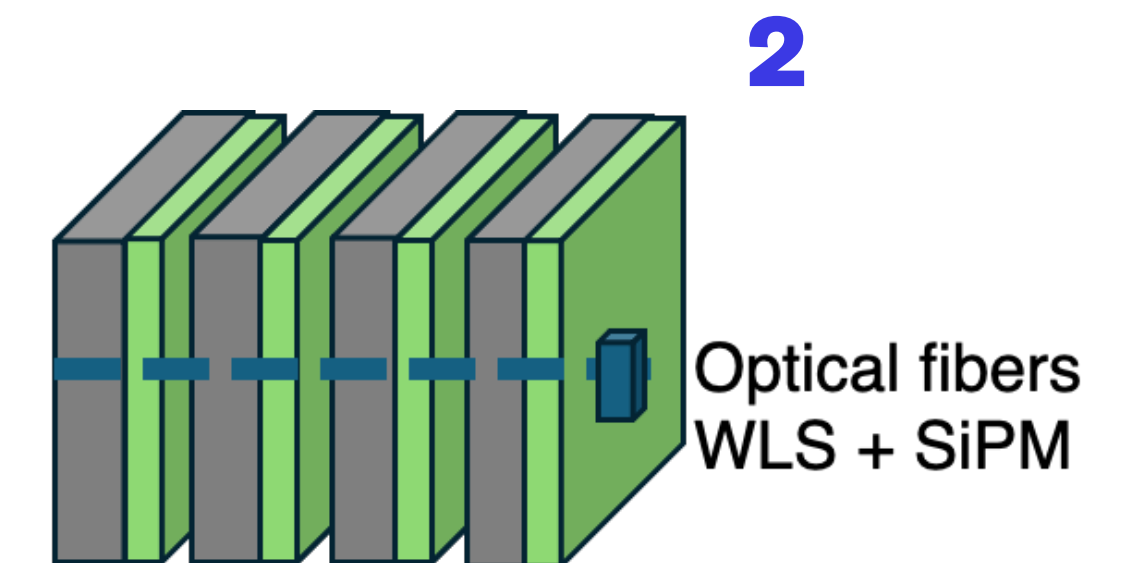
- Build and test both solutions**

- Breakdown of request:

- CsI crystals: $800 + 4 \cdot 250 = 1800$ €
- Steel: 200€
- SiPM taken from Mu2e experiment
- Total: 2500€ (IVA included)



- 1 layer of
- 6x6x6 cm³ Steel
 - 4x6x6 cm³ CsI puro



- 4 layer of
- 1.5x6x6 cm³ Steel
 - 1x6x6 cm³ CsI puro