The ENUBET experiment: a monitored neutrino beam

On behalf of the ENUBET collaboration
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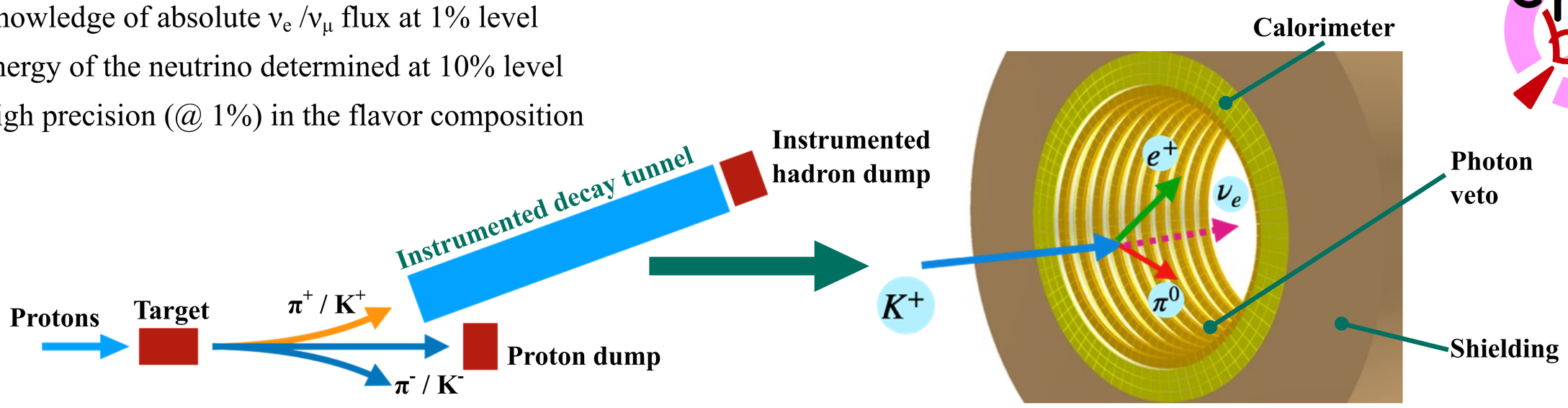
The idea of monitored ν beams

ENUBET (**E**nhanced **N**e**U**trino **BE**ams from kaon **T**agging): a narrow-band beam for the precision era of ν physics:

- Knowledge of absolute ν_e /ν_μ flux at 1% level
- Energy of the neutrino determined at 10% level
- High precision (@ 1%) in the flavor composition



- The instrumented decay tunnel allows to monitor the **decay $K_{e3} \rightarrow e^+ \pi^0 \nu_e$ → Neutrino flux** determination from **e^+ counting**
- Extend to the monitoring of muons from **$K_{\mu\nu}$ decays** for the **ν_μ flux** determination

The Demonstrator

Largest prototype of the ENUBET collaboration:

- 75 scintillator arches + 75 iron arches → **1.65 m length**
- **45° radial opening**

Calorimeter (e^+ / $\pi^\pm$ / μ separation):

⇒ Sampling calorimeter: plastic scintillator + Iron absorbers

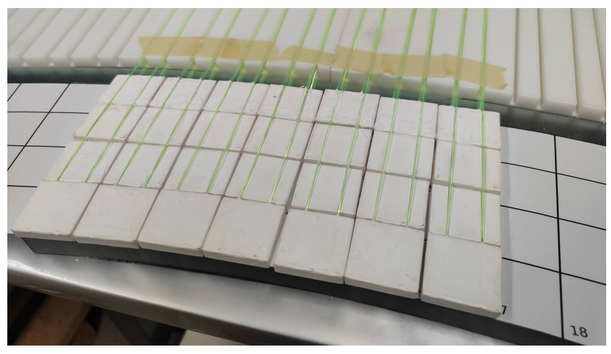
⇒ Three radial layers of Lateral Compact Modules ($3\times3\times10$ cm^3 ~ 4.3 X_0) with longitudinal segmentation

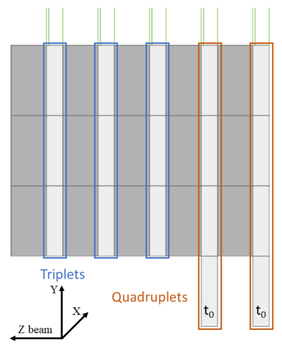
⇒ Light collection/readout: WLS fibers and SiPMs

Photon veto ($\pi^0 \rightarrow \gamma\gamma$ rejection):

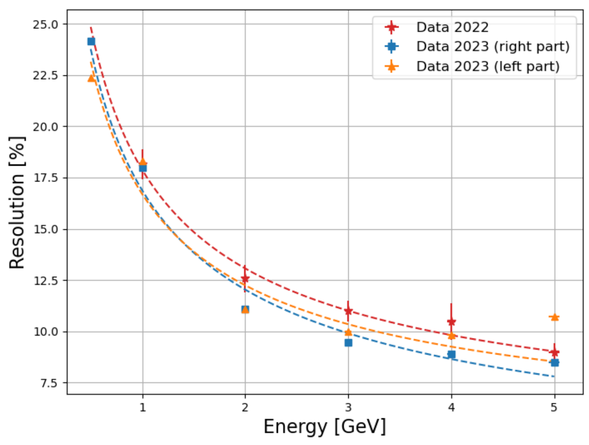
⇒ Plastic scintillator tiles: 3×3 cm^2 tiles arranged in doublets forming an inner ring below the calorimeter

⇒ Time resolution of 400 ps

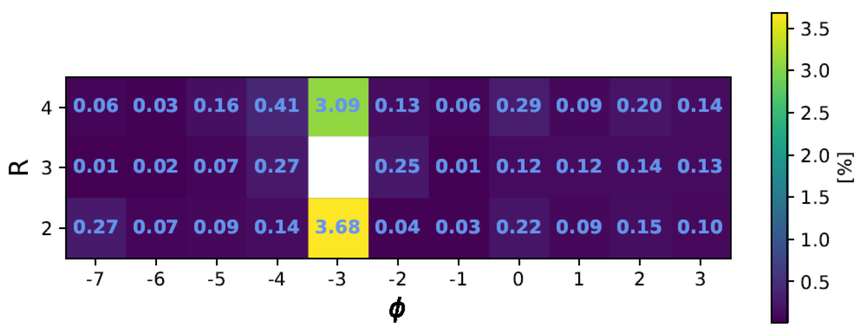




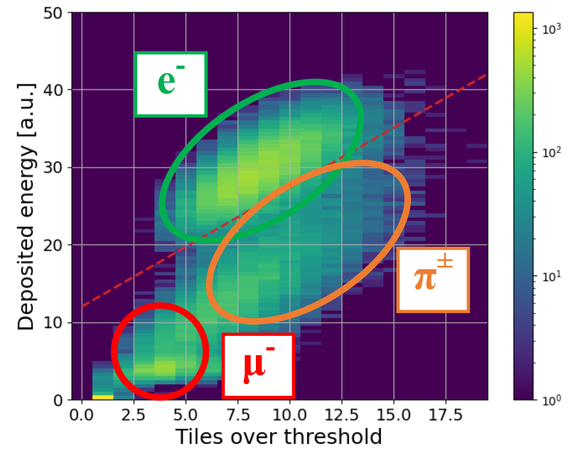
Beamtest results



Energy resolution



Crosstalk analysis



Particle IDentification

Future perspectives

- **DAQ software implementation**
- **CERN beamtest data analysis**
- **Simulation of the Demonstrator with the Geant4 toolkit**
- **Implementation of new PID algorithm**