

What we do in the SHADOWS ECAL Edition



PRISMA⁺
DETECTOR LAB

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EURIZON Detector School – 27.7.2023

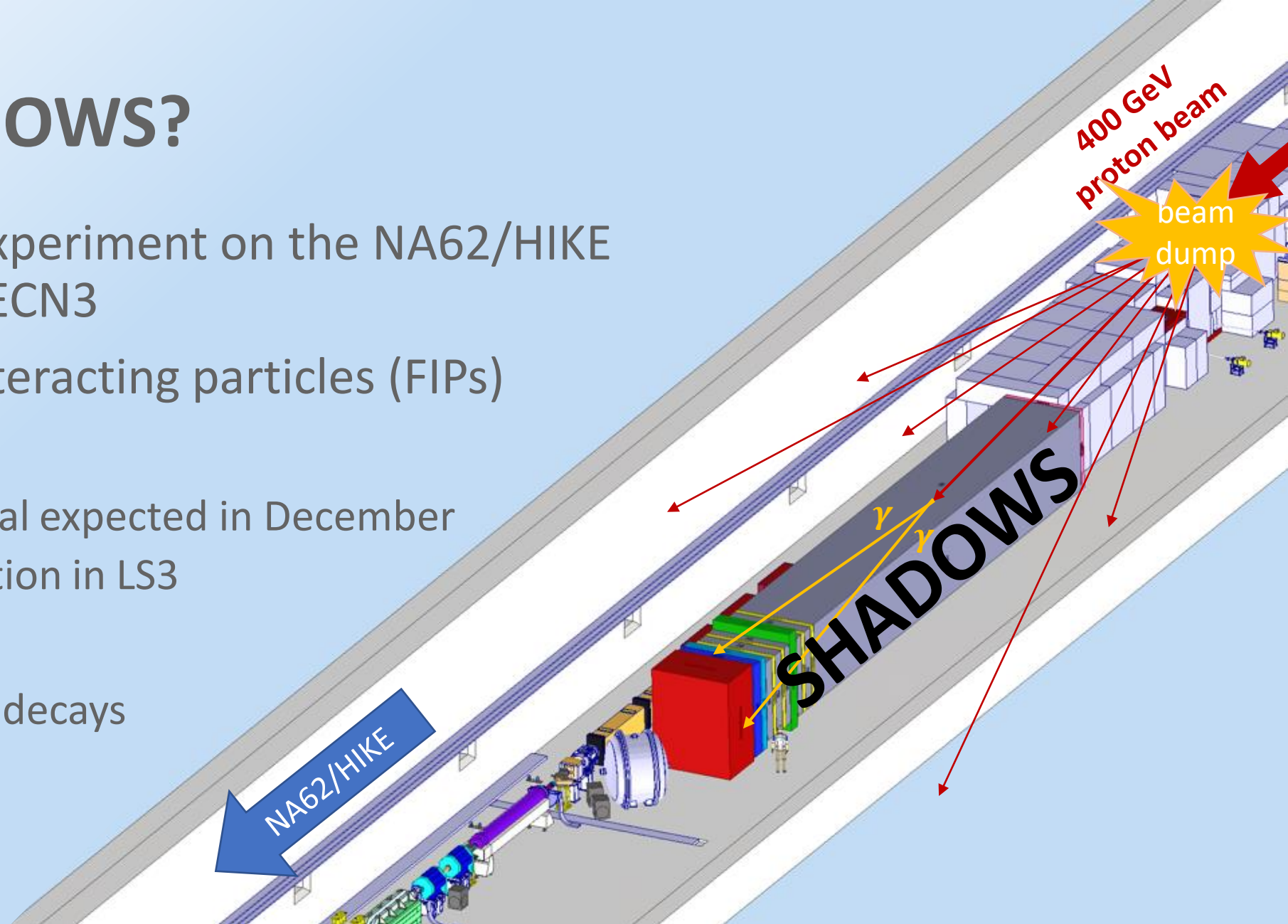
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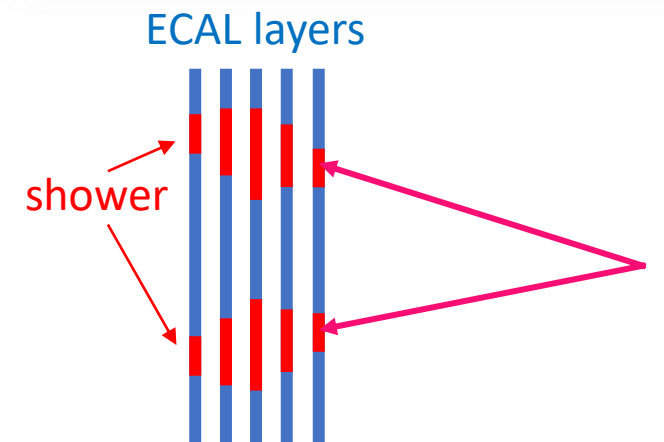
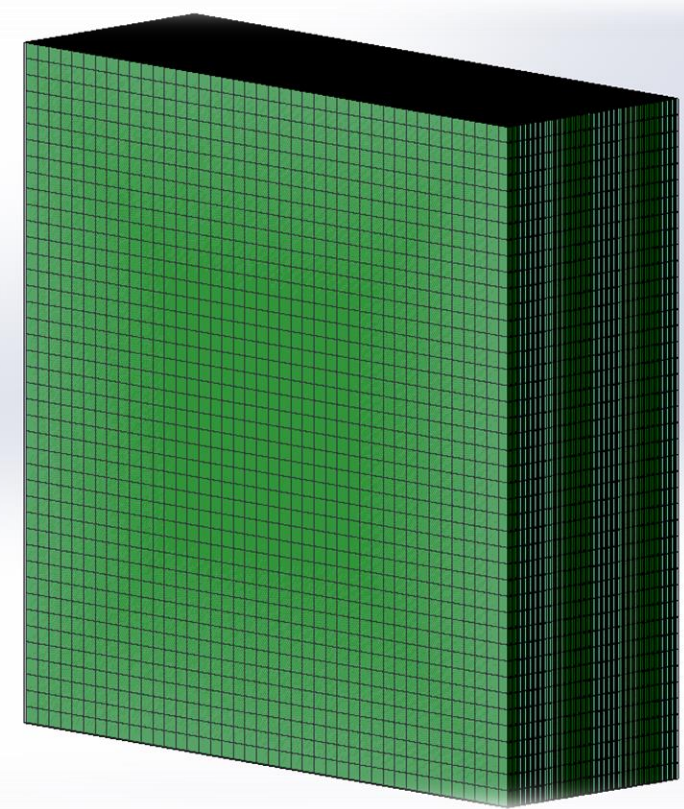
WHAT IS SHADOWS?

- Proposed off-axis experiment on the NA62/HIKE beam line at CERN ECN3
- Search for feebly interacting particles (FIPs)
- Time scale:
 - Decision on approval expected in December
 - Ready for construction in LS3
- ECAL:
 - Measure ALP $\rightarrow \gamma\gamma$ decays
 - Reconstruct mass



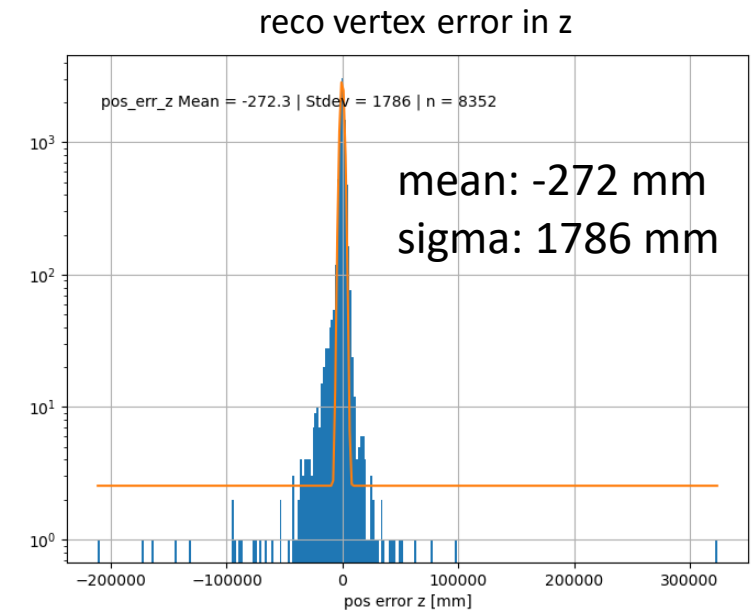
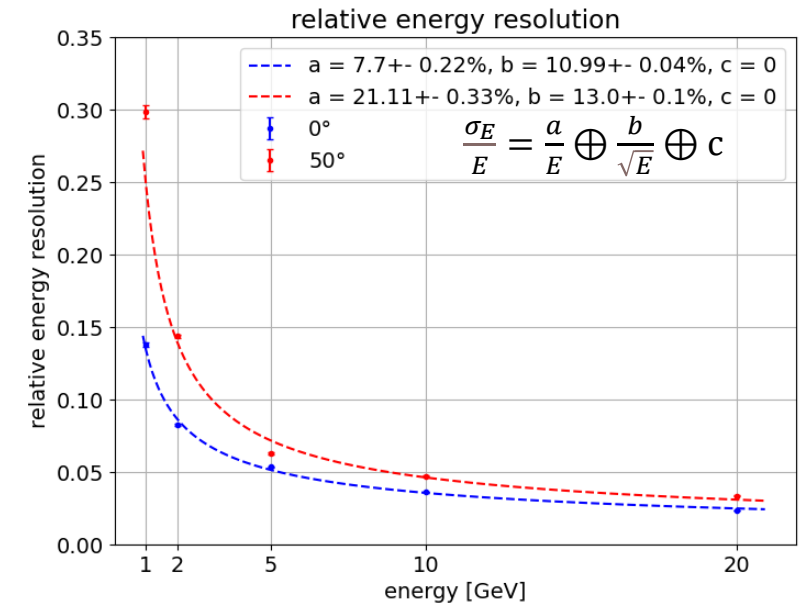
ECAL CONCEPT AND SIMULATION

- General:
 - Sandwich ECAL with iron absorbers and plastic scintillator layers
 - 35 layers, $20 X_0$ total, $2.5 \times 2.5 \text{ m}^2$ cross section
- Tile ECAL study:
 - Different tile sizes tested for a tile-on-SiPM
 - For required pointing resolution
 $1 \times 1 \text{ cm}^2$ tiles needed, 2.2M channels
- Strip ECAL study
 - Tiles joined into $250 \times 1 \times 1 \text{ cm}^3$ scintillator strips
 - Double sided WLS-on-SiPM readout, 18k channels
 - **Energy and angular resolution basically the same**



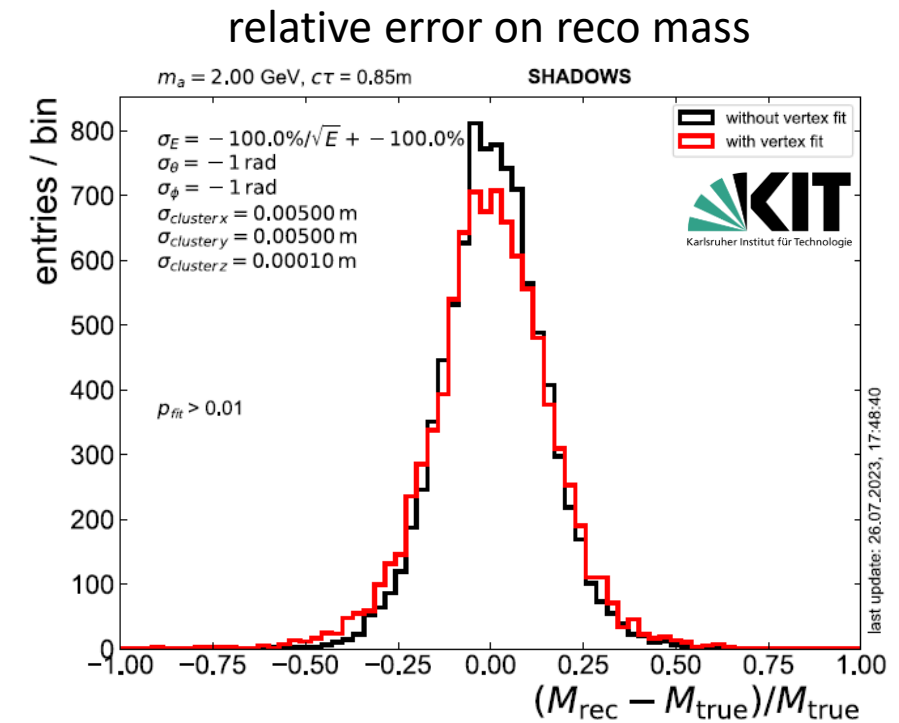
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SO WHAT?

- Baseline design for scintillator strip based ECAL
 - Energy and pointing resolution requirements fulfilled
 - ALP mass reconstruction capabilities achieved
 - Estimated cost below 1M €
- Proposal for CERN ECN3 upgrade in cooperation with HIKE will be handed in in 3 weeks
- Best case I will spend the rest of my PhD designing and building the proposed ECAL





Highly recommended!

