What we do in the SHADOWS ECAL Edition

PRISMA+ DETECTOR LAB

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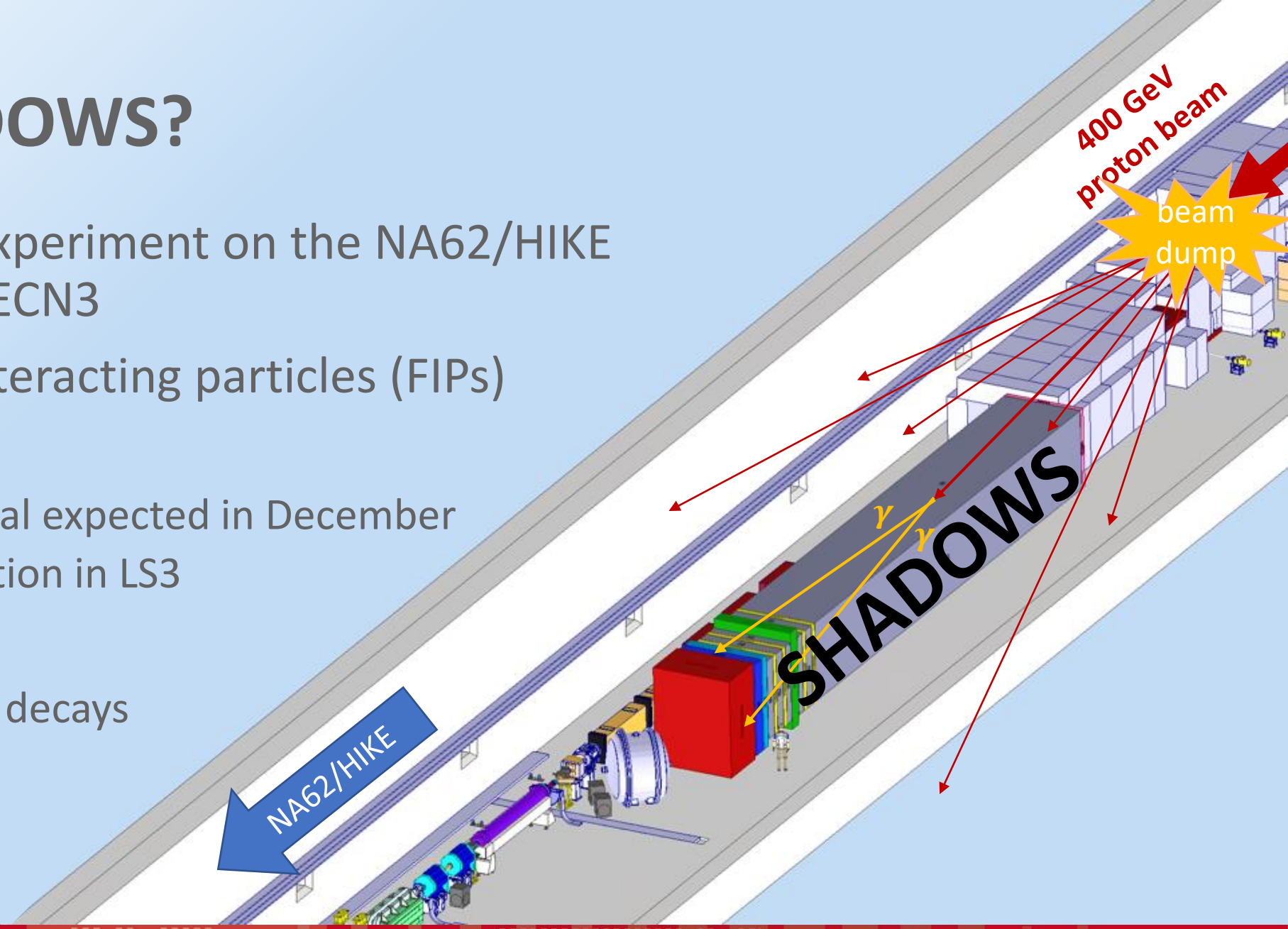
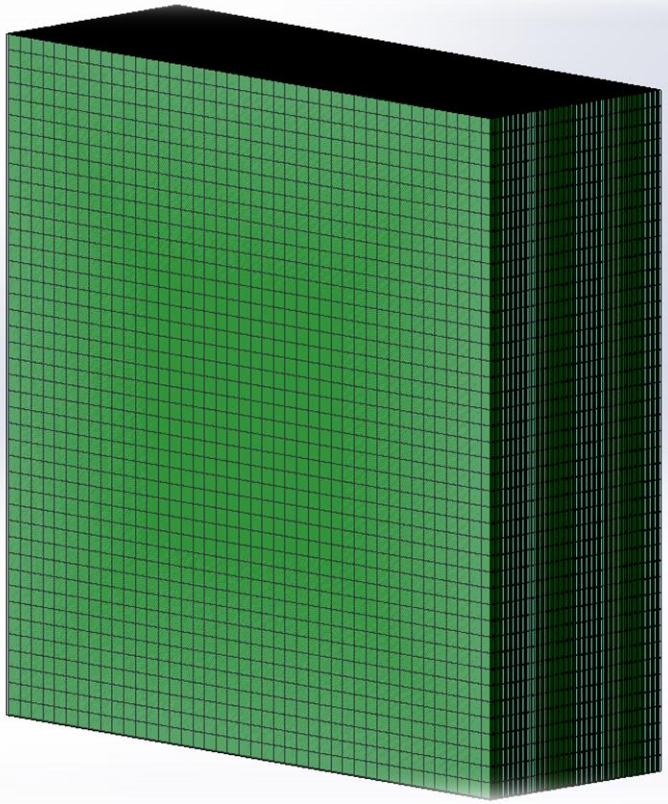
WHAT IS SHADOWS?

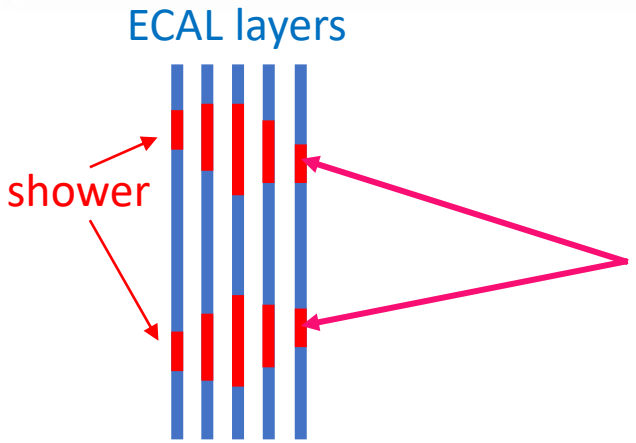
- Proposed off-axis experiment on the NA62/HIKE beam line at CERN ECN3
- Search for feebly interacting particles (FIPs)
- Time scale:
  - Decision on approval expected in December
  - Ready for construction in LS3
- ECAL:
  - Measure ALP -> $\gamma\gamma$ decays
  - Reconstruct mass



ECAL CONCEPT AND SIMULATION

- General:
  - Sandwich ECAL with iron absorbers and plastic scintillator layers
  - 35 layers, 20 X_0 total, 2.5 x 2.5 m² cross section
- Tile ECAL study:
  - Different tile sizes tested for a tile-on-SiPM
  - For required pointing resolution 1 x 1 cm² tiles needed, 2.2M channels
- Strip ECAL study
  - Tiles joined into 250 x 1 x 1 cm³ scintillator strips
  - Double sided WLS-on-SiPM readout, 18k channels
  - **Energy and angular resolution basically the same**





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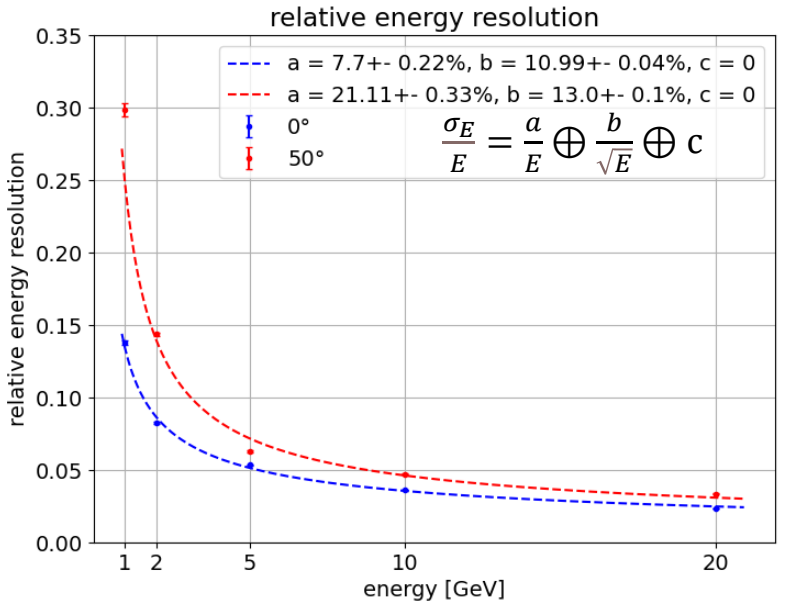
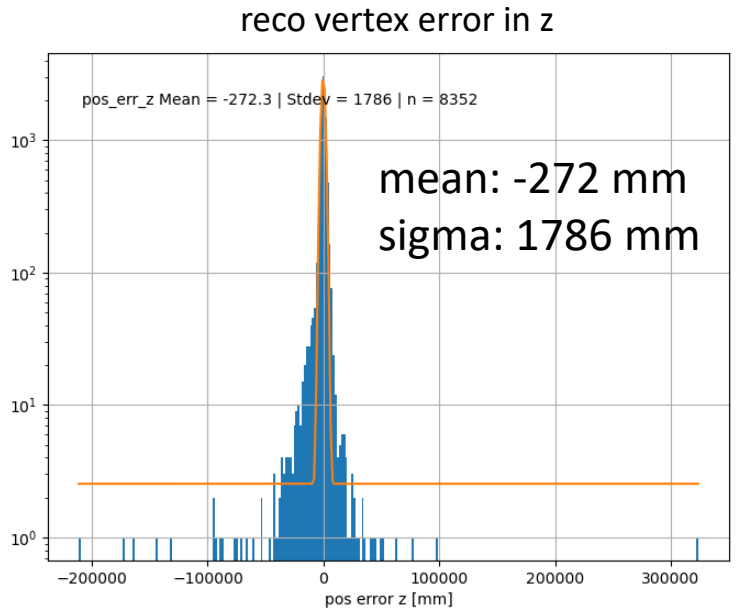


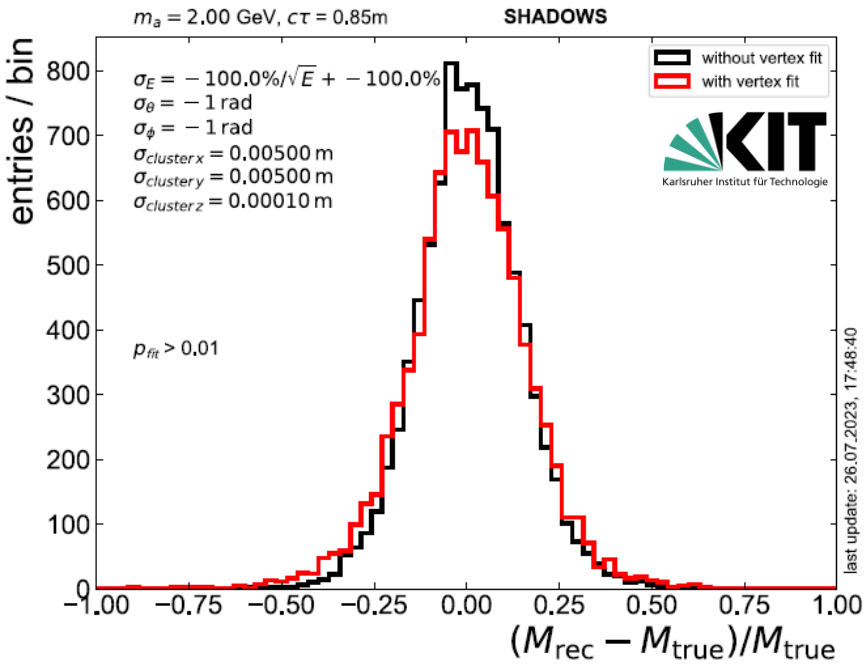


SO WHAT?

- 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

relative error on reco mass



Highly recommended!