Topics for the workshop

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Plans for Krakow Meeting

Potential talks

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- Adrian (or Melissa): talk on the tests done during the last year on the gluing front
  - For ECALp and ECALe
  - Last tests being done this week: we are gluing few fake sensors to CF – to be brought to Krakow
  - We are still waiting for the newest CFs. Samples … to be expected in 1-2 weeks (hopefully on time for Krakow)

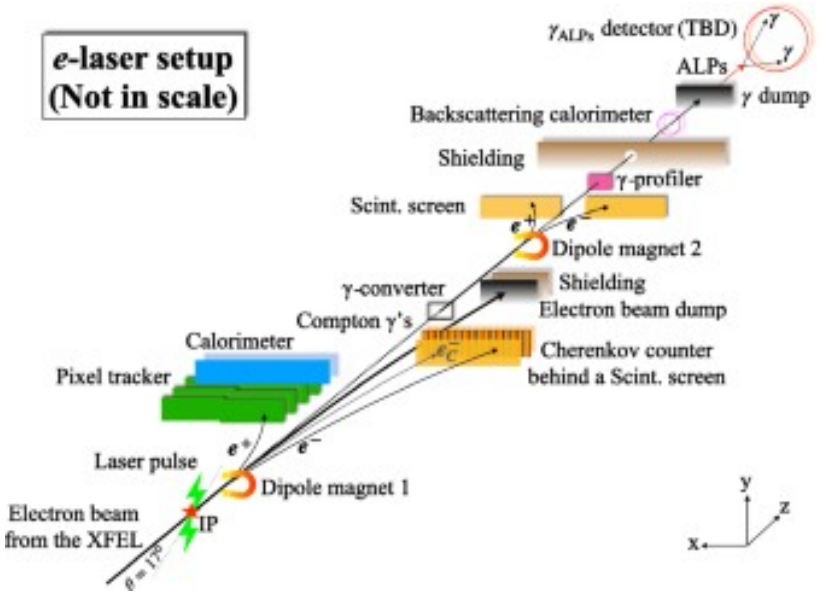
- Carlos: talk on the optimization of the design of the CSIS integration
  - CSIS: Compact SIlicon Sandwich = CF+ glue or tape +kapton + glue dots + silicon + kapton (glue or tape) – 900um to 1000um thick
  - New set of jigs has been designed and are to be produced. The strategy has been revisited and improved.

- Talk on TB2022 analysis ? We haven't produce more results since last study by Melissa.

- New topic: using the LUXE ECALS for NPOD ? → next slide

ECALe studies for using it as NPOD detector

- The ECALe is not used during the e-laser mode… what about using it for NPOD?
- Idea first proposed during the Rehovot meeting in Nicolo's talk Q&A
  - First very raw draft of the idea done during the wine tasting that evening…
- The topic has been studied by KIT and they started optimizing the geometry. The goal is to include it in a LUXE-NPOD paper
  - More detailed studies on basic detector performance are needed
  - Hence: we (IFIC) started working on the topic this summer, together with KIT

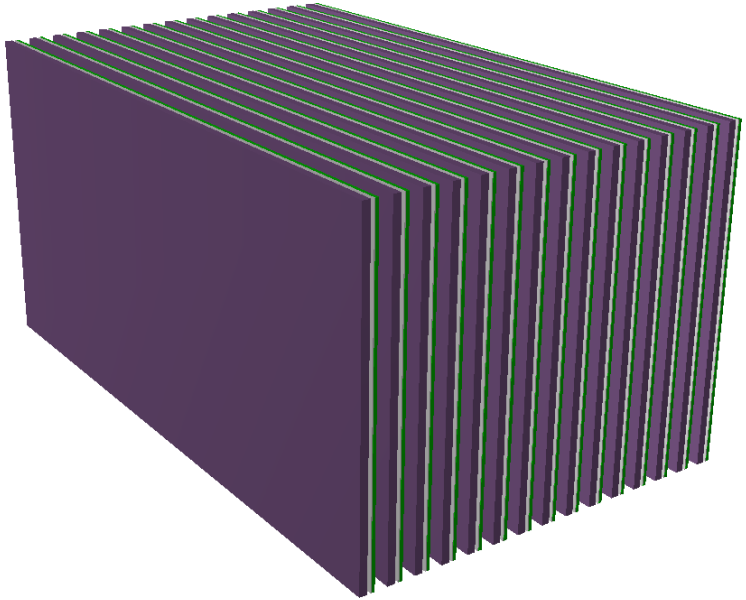


Simulation + code

- Study based on ILCSoft – LCIO tools (and DD4SIM)
  - à la CALICE (which is what I know best… so we can have quick results)
- Code – wip https://github.com/airqui/ECALe-lcio
  - Generation of gun particle events
  - Pixelization
  - MIP calibration + Digitization (not completely dummy)
  - Tools for clustering, merging of single particle events, etc…

Generation – based on a realistic ECALe

- ECALe_LUXE_v1.xml
- 15 layers 36x18cm^2 surface
- 4.2mm W + CF + readout module with Si.
  - Initially we simulate a single Silicon surface (no pads) → these are created in a second step (Pixelization).
- W distribution is not fixed yet by the SiWECAL group.
  - Note: the single-unit- of W thickness was 2.1mm because these were the plates available during last beam test.



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  <!-- the aluminum cover was used in the TB2022-06 but it can be removed! , so we remove it here-->
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```

Energy Resolution / Linearity

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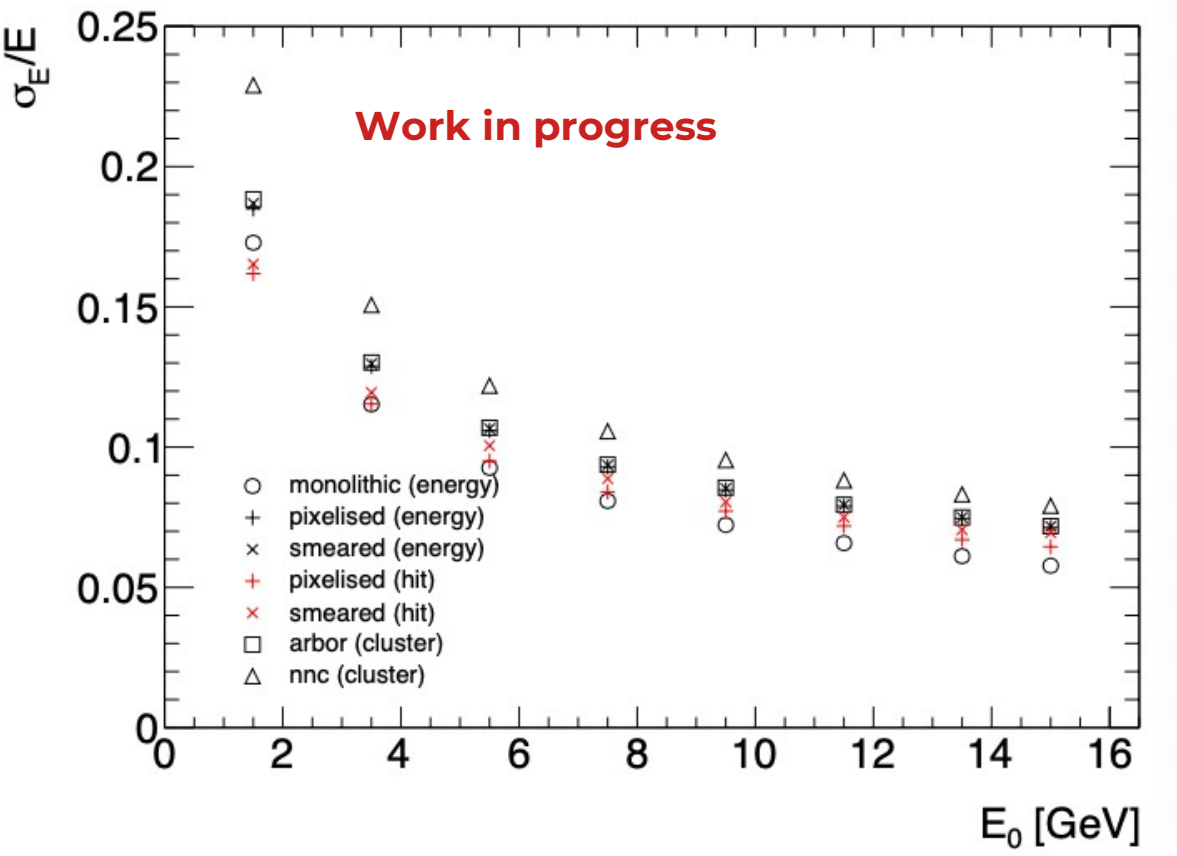
- Calculated with gun electrons.



Calculated with gun electrons.

Different “classical” (no ML) clustering techniques being used and optimized:

- ARBOR (ParticleFlow) Not trivial to optimize

- NNC – Near Neighbour Clustering

Clustering of two photons – reconstruction of ALP decay vertex

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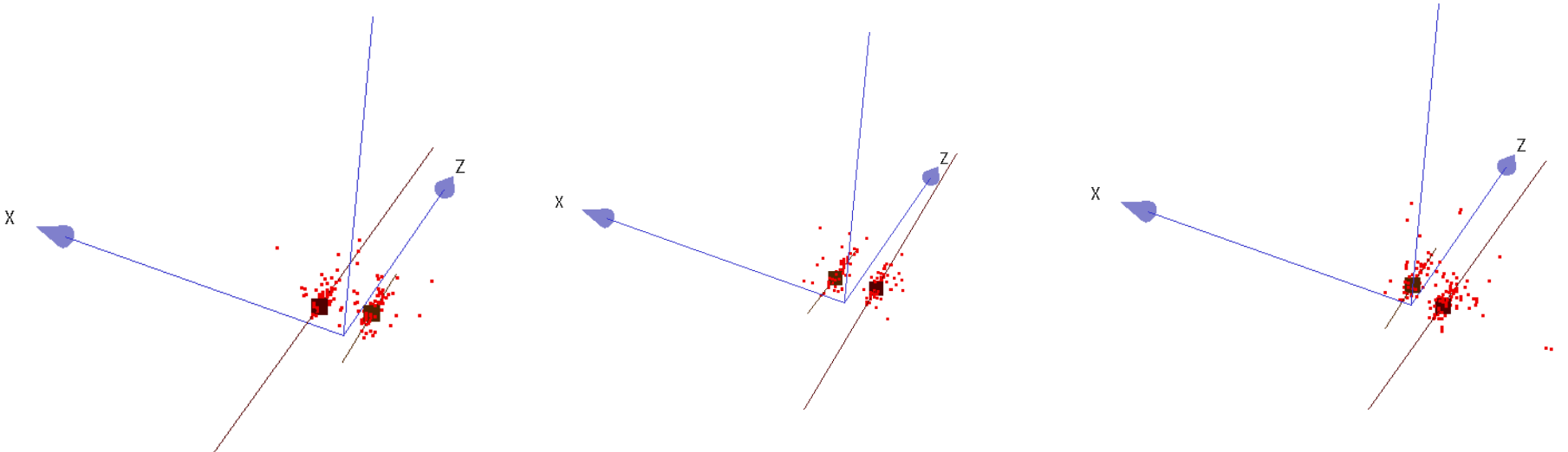
- Arbor seems the most promising for single particles… but just because it basically takes all hits in the detector and creates a single cluster
  - Useless when reconstructing 2 photons (ALPS → Gamma Gamma)
  - We still don't know how to optimize it.

- We optimized the NNC and it looks very promising for the two photon reconstruction (direction and core of the shower). For the energy resolution it may need some optimization…



Particle Identification studies

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- For the NPOD, it is required an effective neutron (bkg) – gamma separation

With help of Jesús P. Márquez (ILC PhD candidate)

- J. is writing his thesis. It has a code that performs training and PID for ECAL+AHCAL at high energies (CALICE studies).
  - "Straightforward" translation to our case.
  - Samples with NPOD energies and species have been produced. Melissa is producing histograms for the BDT to be run.

Plans for the workshop and later

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- This is being discussed and coordinated with KIT → for a paper which is to be submitted this year (preliminary title “Layout optimization for beam dump experiments”)
- Krakow: one presentation with quantitative results – Shan (and/or Melissa?)
- To be presented too in the SAS meeting (October)

- Optimization of detector layout ?
  - More layers?
  - What about the performance of a more compact calo “ECALp-like” ?