SoLAr prototype Layout concept

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Motivation

• To propose a PCB layout with combined charge and light pixel cells for a first prototype of SoLAR tile and readout by the currently available electronics of ArgonCube modules.
Tile layout concept

Tile dimensions: 100mm x 100mm

SiPM dimensions: 6mm x 6mm
Charge collecting pixel dimensions: 3mm x 3mm

Each 1 cm² cell hosts one SiMP and five charge collecting pixel pads.
Close up view of a cm$^2$ cell
Back side of the tile PCB

For the readout of the tile, we need:

**Charge:**
10 LArPix chips [cold] (LBNL)
1 PACMAN [warm] (LBNL)

**Light:**
10 preamplifier adaptor cards [cold] (to be designed)
4 VGAs [warm] (DUBNA)
1 ADC [warm] (DUBNA)
Pixels and SiPMs association to a readout unit

Each LArPix reads 50 charge channels

Each Preamp. Adaptor card reads 10 light channels
Preamplifier card for SiPM signals

- Double sided, 10 channels adaptor card
- Replacing the E-board in the ArgonCube design
3D view of the tile with preamplifier adaptor cards
Summary

• Proposed a prototype tile with both Charge and Light pixel cells
• Using existing electronics used in 2x2 ArgonCube modules
  • 10 LArPix chips + 1 PACMAN
  • 10 preamplifier adaptor cards + VGAs + ADCs
• Study the signal integrity, crosstalk, electrical noise due to charge and light traces on the same PCB
• Next prototyping step: Use LightPix/Qpix chip for the light readout
Backup slides
Light readout scheme overview