

Prototype 2023

PD gluing status

First visit of European team

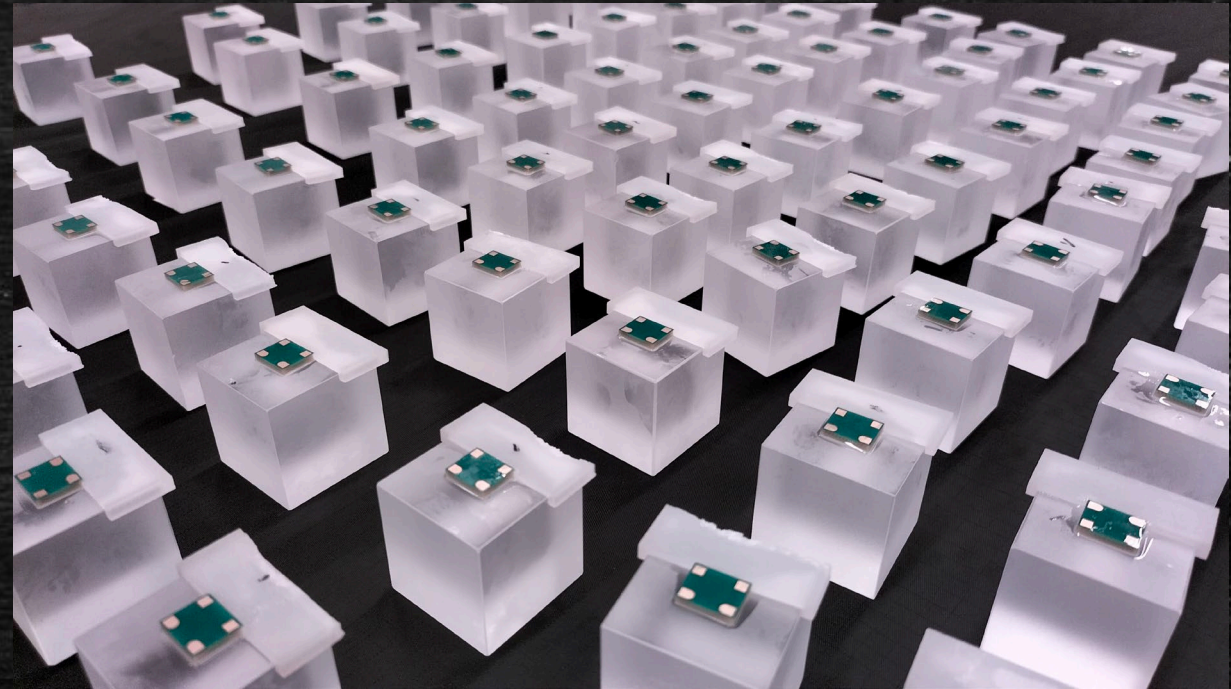
PD gluing

First of all, let me thank the management and all involved staff of the IHEP and CBMA for help, support and sensitivity in both, work activity and personal level.



PD gluing

- PDs are not a definitive flight model version
- Small amount of DC 93500 available
- Simplified gluing routine
 - No thickness control
 - One jig per crystal
 - 24h cure at the ambient temperature
- Dark current test
- Optical coupling test
- 4 full days of work
- ~ 500 crystals assembled and tested

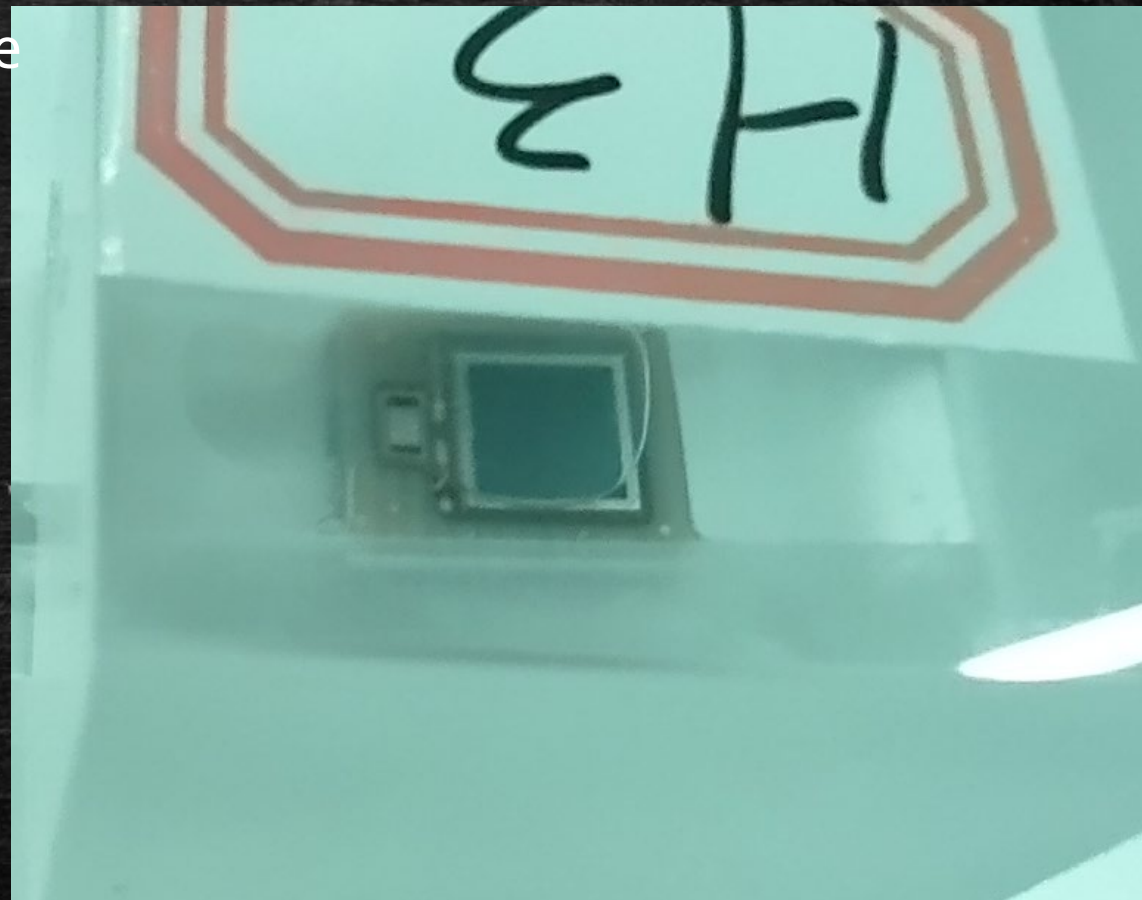


PD gluing

- ~ 10% of PDs had a defects and have been reworked

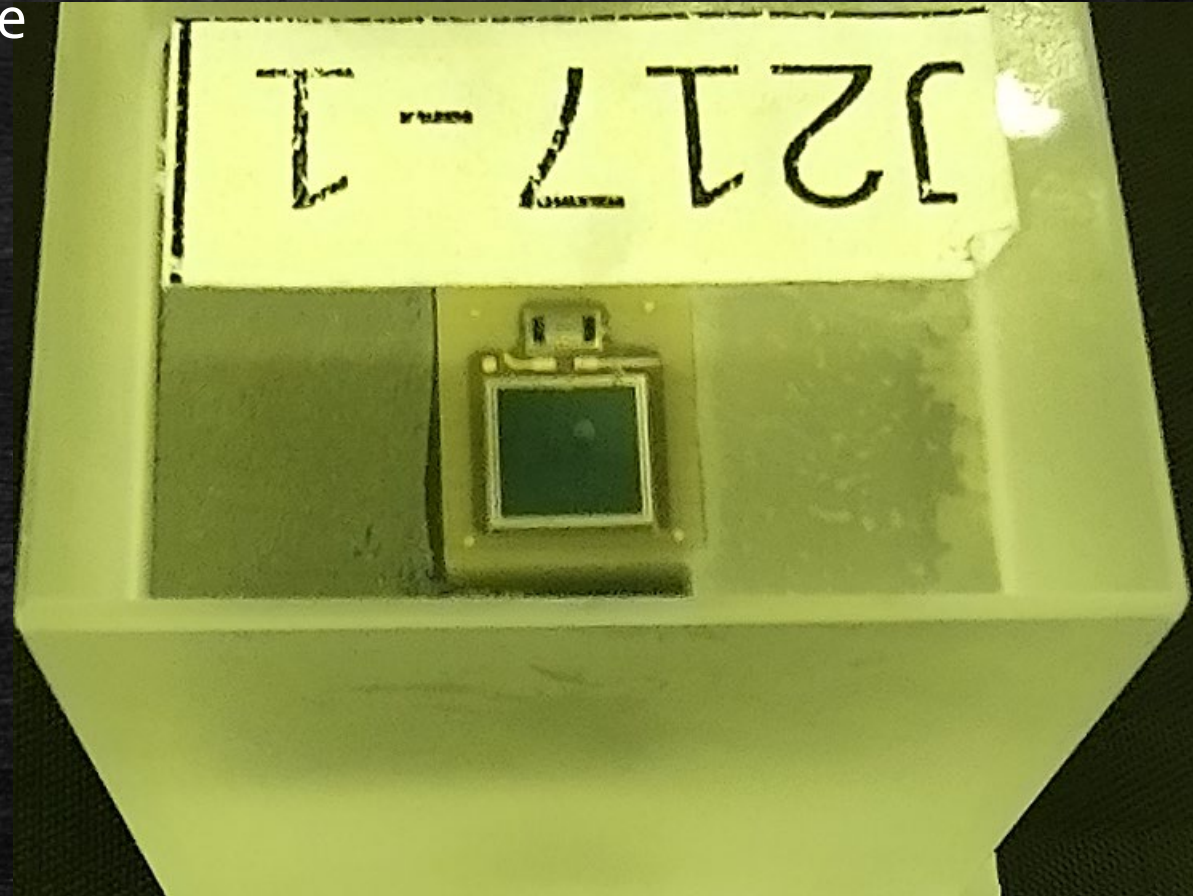
PD gluing

- ~ 10% of PDs had a defects and have been reworked
- 3 main types of defects:
 - Halo



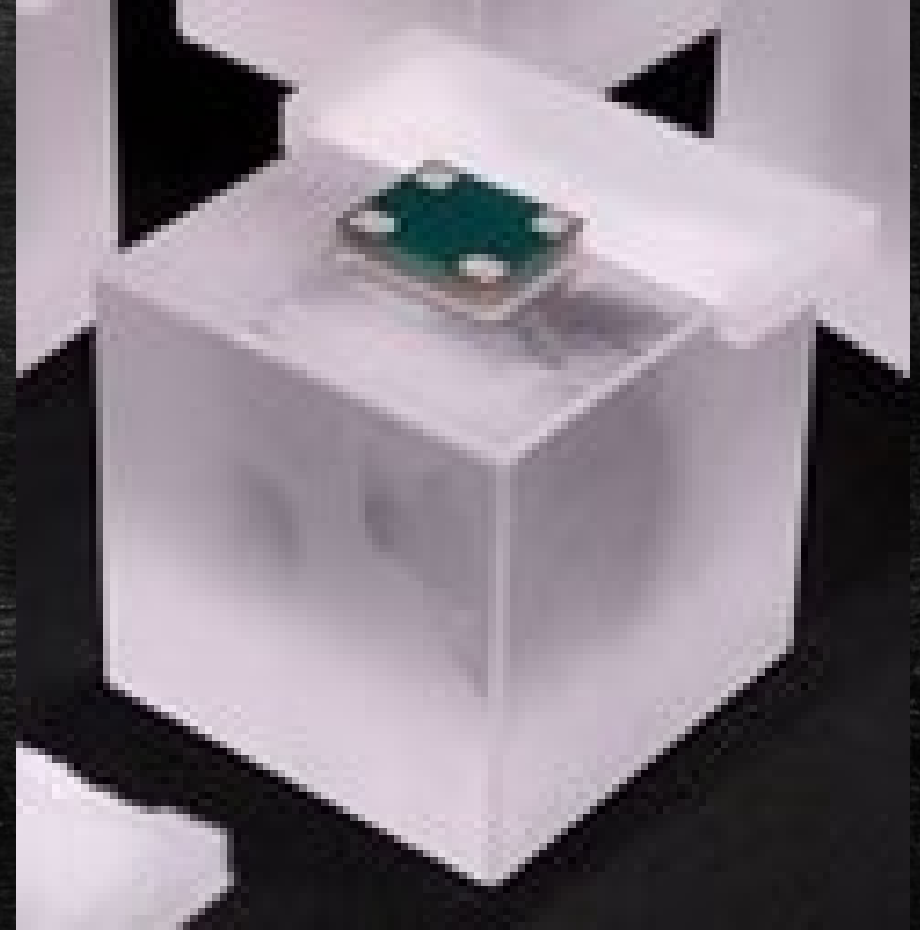
PD gluing

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- 3 main types of defects:
 - Halo
 - Bubbles



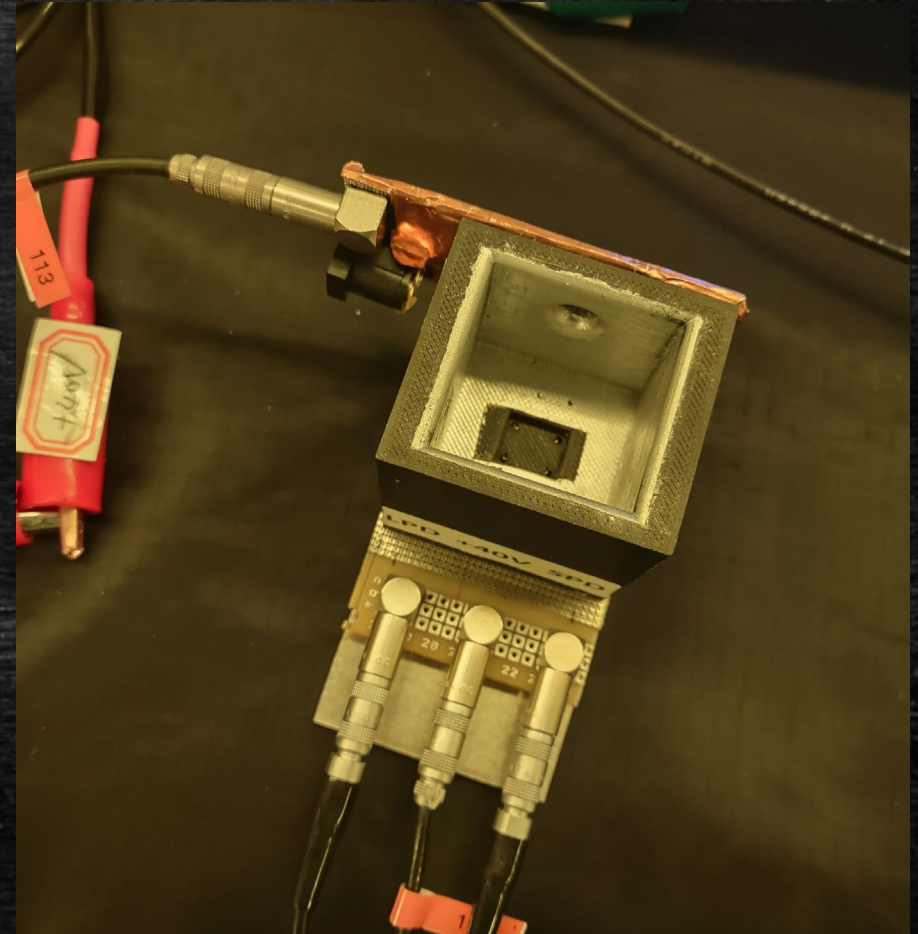
PD gluing

- ~ 10% of PDs had a defects and have been reworked
- 3 main types of defects:
 - Halo
 - Bubbles
 - Geometrical disalignment



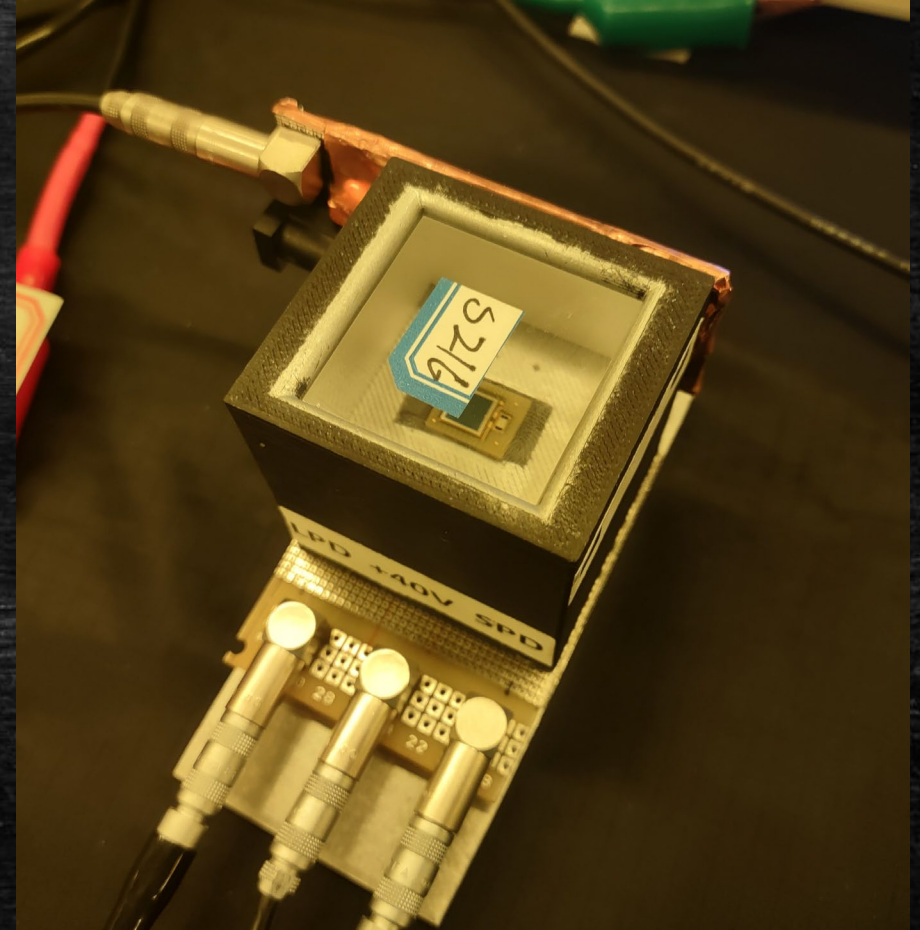
PD testing

- A tool for dark current and optical coupling test
 - Measures a sum of currents for both small and large PDs



PD testing

- A tool for dark current and optical coupling test
 - Measures a sum of currents for both small and large PDs
 - Pulsed UW (417 nm) LED light source
 - Separate signals outputs for small and large PDs
 - Two channel oscilloscope allows simultaneous measurement for both PDs



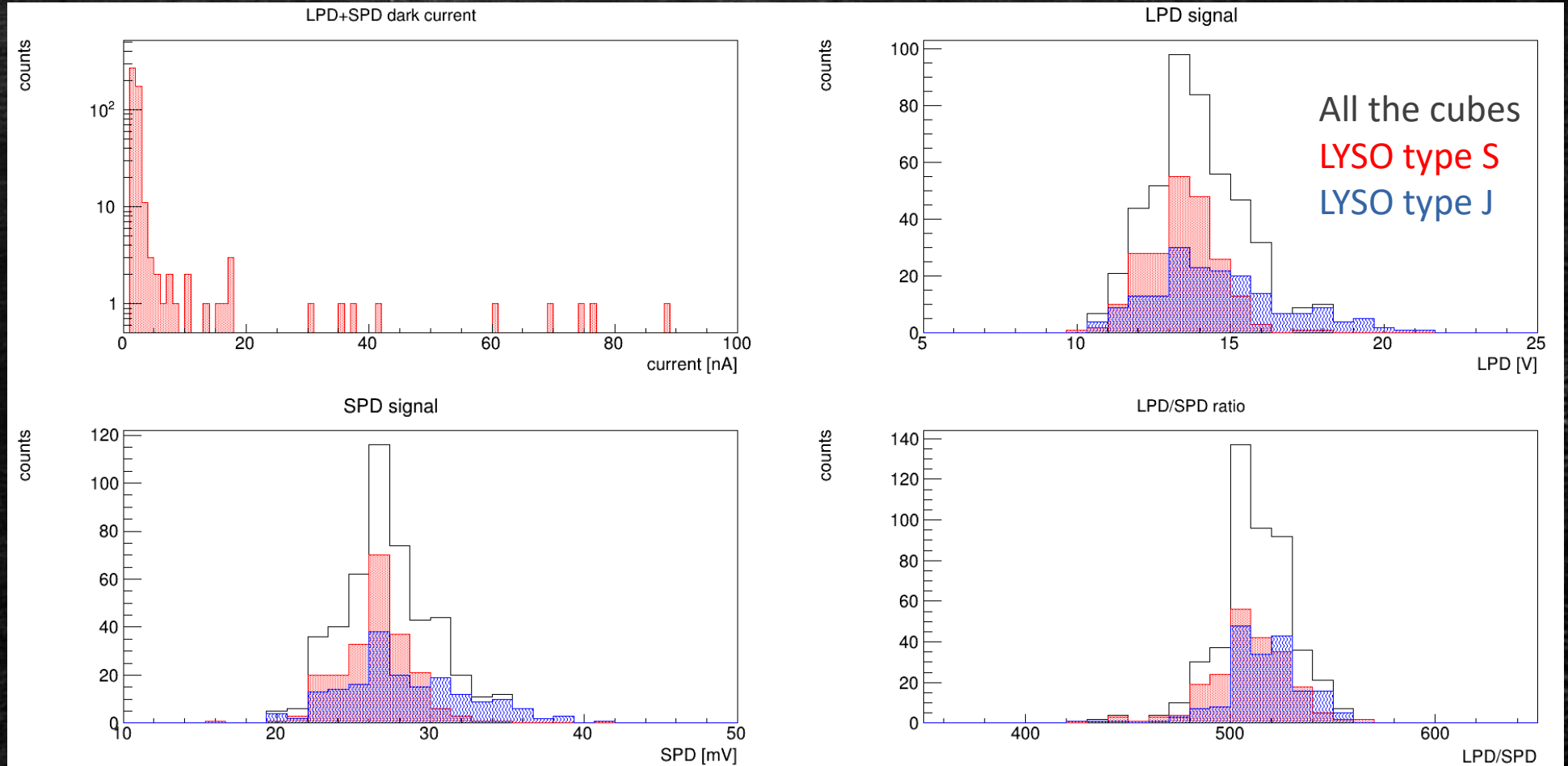
PD testing

PDs with high current ($I > 10$ nA): 20

PDs with very high current ($I > 4$ μ A): 4
(have been replaced)

Different productions of LYSO are shown

The mean LPD/SPD ratio is ~ 510



Conclusion

- First real exercising in a large amount of PD's gluing and testing
- 9 persons team and 4 days to assemble 500 cubes using simplified gluing procedure
- Flight model gluing routine will be more time-consuming and should be optimized
- We need more tests in Florence with large number of cubes. Should be very useful if IHEP colleagues provide us some defective LYSO cubes that can not be used for the prototype building.
- Will be helpful also to test Chinese made silicon glue (Sylgard 184 analogue?).
- We prepare the Kapton cables for our next visit. We are going to solder small wires to connect Kapton cable and PDs. We need an ultimate CAD model of the prototype to choose right wires length.