

SiPMs for ProtoDUNE-VD

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Status of SiPM production

- There are **3 cold-box X-ARAPUCA modules** equipped with SiPMs (different model)
 - Do we want to keep them for cold-box testing and not reuse them in ProtoDUNE-VD?
- **New sensors:**
 - 500 HPK SiPMs (paid by Italy) sent to UCSB for population of the flexi boards
 - To be used for ProtoDUNE-VD directly (not for cold-box XAs). The cables need to be customized.
 - 702 HPK SiPMs (paid by Spain) already at CIEMAT → will be sent to SCEN when the INFN order is ready
 - 250 FBK SiPMs (paid by FNAL) will be delivered in about 1 week
 - 750 FBK SiPMs: order being placed by INFN. Delivery date: end of Jan 2023
 - 1000 additional HPK SiPMs (if needed): 6 weeks delivery; quotation ready
- 1452 SiPMs available NOW → HOWEVER, we cannot mix HPK and FBK sensors in the same module. Therefore, we have SiPMs to assemble:
 - **8 X-ARAPUCAS**: 7 HPK X-ARAPUCAs + 1 FBK X-ARAPUCA (we “loose” 0.5 HPK and 0.5 FBK)
 - Possibility: 4 XAs by December for the membrane + 4 XAs by January for the cathode??
- By end of January 2023, we may have SiPMs to equip **5 extra FBK X-ARAPUCAs** (750+90)
 - It seems this is not compatible with current schedule of installation in December and January.

Boards + testing

- **Flexi-boards production** (60 FBK + 140 HPK): produced by US to be sent to Milano (mid-October)
- Once assembled in the flexi boards by an Italian company (SCEN), SiPMs will be tested in groups of 20 in LN₂ (test procedure details to be defined in the Photosensor WG meeting next Tuesday)
- **When can we have the sensors for 8 XAs ready to be assembled with the rest of components at CERN?** Time to consider (beyond the procurement):

Delivery of SiPMs and flexi boards to SCEN + assembly of SiPMs in the boards by SCEN + delivery back of SiPMs to the testing institutions + testing time + shipment of SiPMs to CERN

TOTAL TIME ~ 2-3 weeks?