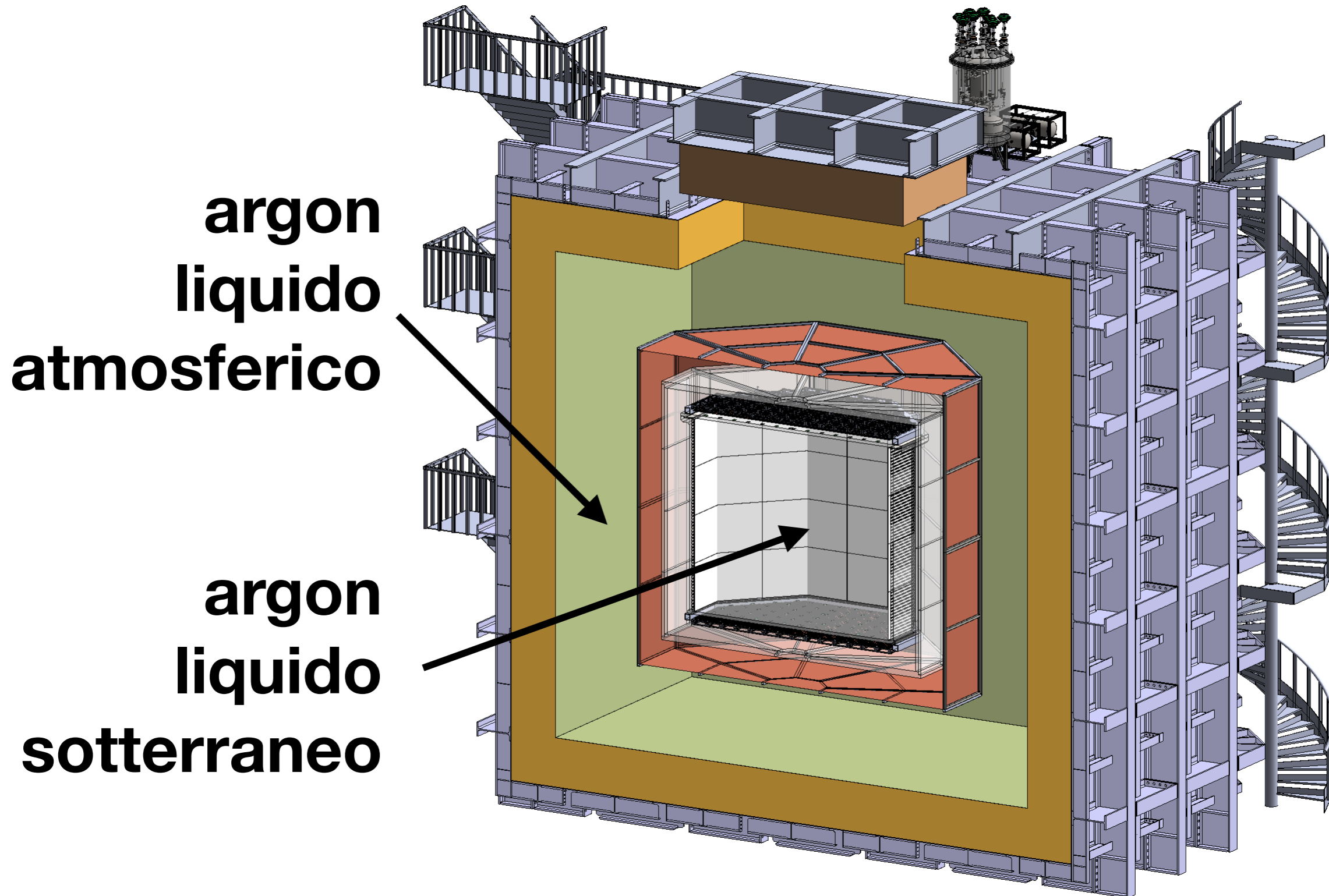


Darkside

presentazione in sezione

2022

Eugenio Paoloni INFN & Università di Pisa



Darkside Good and Bad News

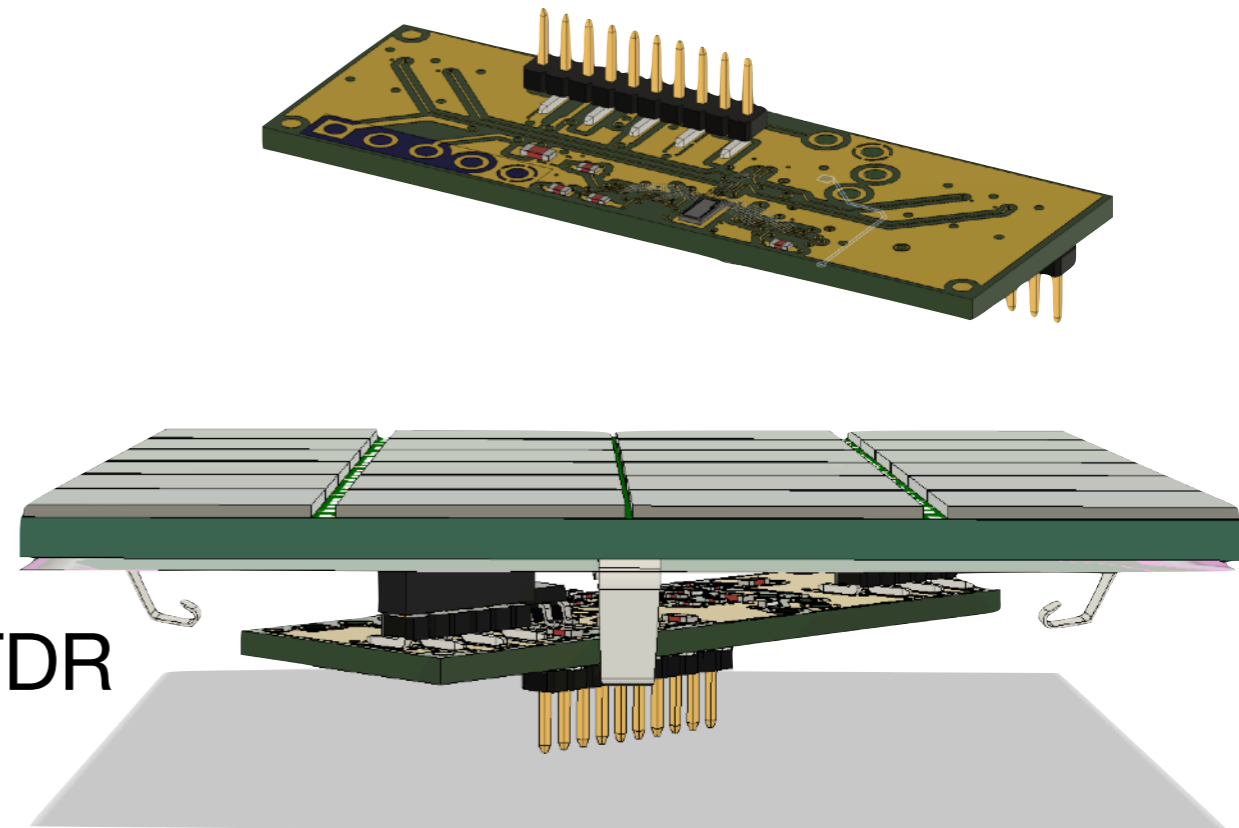
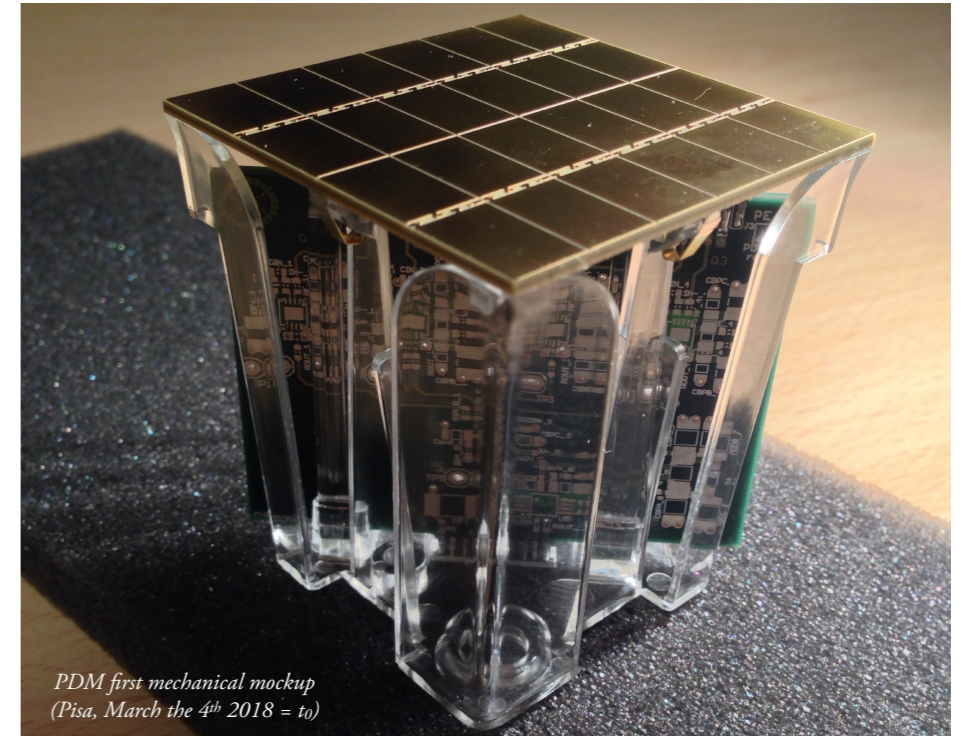
- Good news
 - First batch of SiPMs from LFoundry are showing better than expected DCR
- Bad news
 - The Through Silicon Via (TSV) R&D is on a dead track: the TSV cannot withstand the reverse bias voltage of the SiPM
 - Pisa expertise on wire-bondings is going to be a crucial asset for the Darkside collaboration
 - The backside metallization of the SiPMs and/or the gluing procedure on the printed circuit board are giving inconsistent results (parasitic series resistance of the contact too high, neither stable nor uniform across device).
 - Earthquake safety requires the construction of a reinforced concrete basement below the Darkside veto: reduced vertical space for the TPC -> thinner detector modules

Ongoing Activities

- SiPM characterization
 - A set of 35 tiles 5cm x 5cm made with 24 LFoundry SiPMs are in Pisa for characterization (Thanks to Alessandro Profeti's skill and patience for wire-bonding them)
 - A second set of ~ 30 tiles are going to arrive in a few days
 - Characterization of the backside metallization (stability, uniformity, overall quality)
 - Characterization of the SiPMs
 - Break-down voltage, gain, signal to noise ratio

Ongoing Activities

- Re-design of the photo detector module (PDM) to reduce its thickness (in rush mode)
- Two proposals under evaluation
 - Pisa+Bologna+Torino are working on the “PDM slim”
 - CASTOR Asic (Torino)
 - LNGS Tile+ are working on the Tile+ (radical new concept)
- Must be ready and described in the TDR document requested by INFN



On going Activities

- DAQ:
 - Characterization of the single photon reconstruction algorithms suitable for the online
 - Simone Stracka + Giacomo Petrillo
- RED
 - Simulation and data analysis
 - Michael Kuss

Preventivi 2022

- The collaboration will decide by October 2021 among the two PDM proposals
 - The fundings needed for the construction of the original project are already assigned to Pisa
 - The money assigned for 2020 for the construction of the moldings of the acrylic components of the PDM will be used to build the molding of the PDM slim prototype (tender not yet started)
 - The money assigned for 2021 for the construction of the whole set (~ 9000) of acrylic components of the PDM for DS 20k will be used if the PDM slim is going to be selected
 - The collaboration is still deciding how to proceed if the Tile+ will be selected

Preventivi 2022

- Anyway:
 - The construction of the components of the photo-electronics in Pisa will be completed by 2021
 - The focus of the Pisa group will shift on:
 - The DAQ
 - The quality control and check of the Photo-electronic components
 - Cryogenic test stand in clean room
 - Giovanni Batignani (Chair of the Advisory Committee)
 - Eugenio Paoloni L1 of the Photo-electronics (? it depends on the collaboration reorganization of the management requested by INFN)

Requests

- Keep the allocated space in clean room for 2022
- Support from the Alte Technologie experts to the LNGS wire-bonding team (1 month person)
- Support from the Alte Technologie for tests of problematic PDMs (6 months person)

Anagrafica

- Giovanni Batignani 50%
- Eugenio Paoloni 50%
- Simone Stracka 70%
- Michael Kuss 30%
- Mauro Morganti