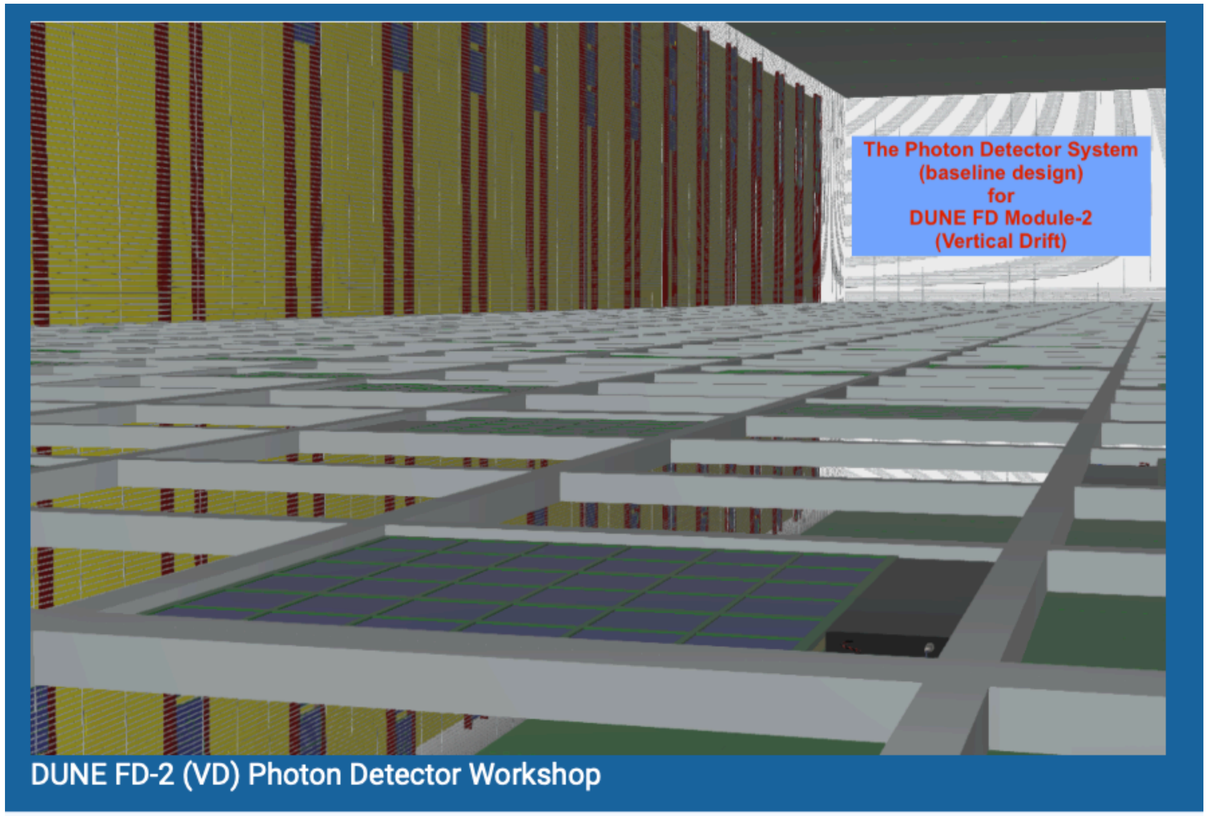
A summary from

VD PDS Workshop

Opportunity for contributions

Flavio - Jul. 29, 2021



Overview
Timetable
Contribution List
My Conference
My Contributions
Registration
Participant List

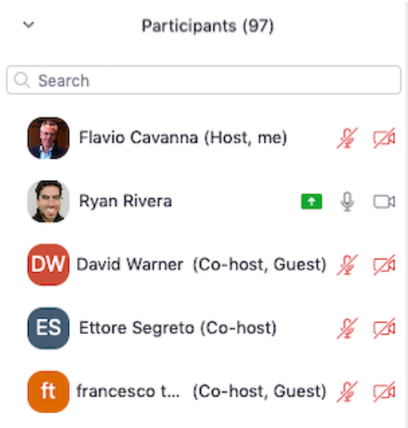
The DUNE Photon Detector Consortium hosts a (first) Workshop on
Opportunities for Involvement in the Far Detector 2 Photon Detector System

Starts Jul 26, 2021, 8:00 AM
Ends Jul 27, 2021, 1:35 PM
US/Central

Detector_take2.mp4

Registration
You are registered for this event.
See details >

Organizers and Hosts of the WS



Participant List

116 participants

First Name	Last Name	Affiliation
Ajib	Paudel	Fermi National Accelerator Laboratory
Alan	Prosser	Fermilab
Alberto	Marchionni	Fermilab
Aleena	Rafique	Argonne National Laboratory
Alessandra	Tonazzo	APC Université de Paris
Alex	Himmel	Fermilab
Andre	Steklain	Universidade Tecnologica Federal do ...
Xiao	Luo	UCSB
Yasar	Onel	University of Iowa
Zelimir	Djurcic	Argonne National Laboratory
Zohreh	Parsa	Brookhaven National Laboratory

from US	from EU+UK	from LA	non DUNE
51	33	21	10

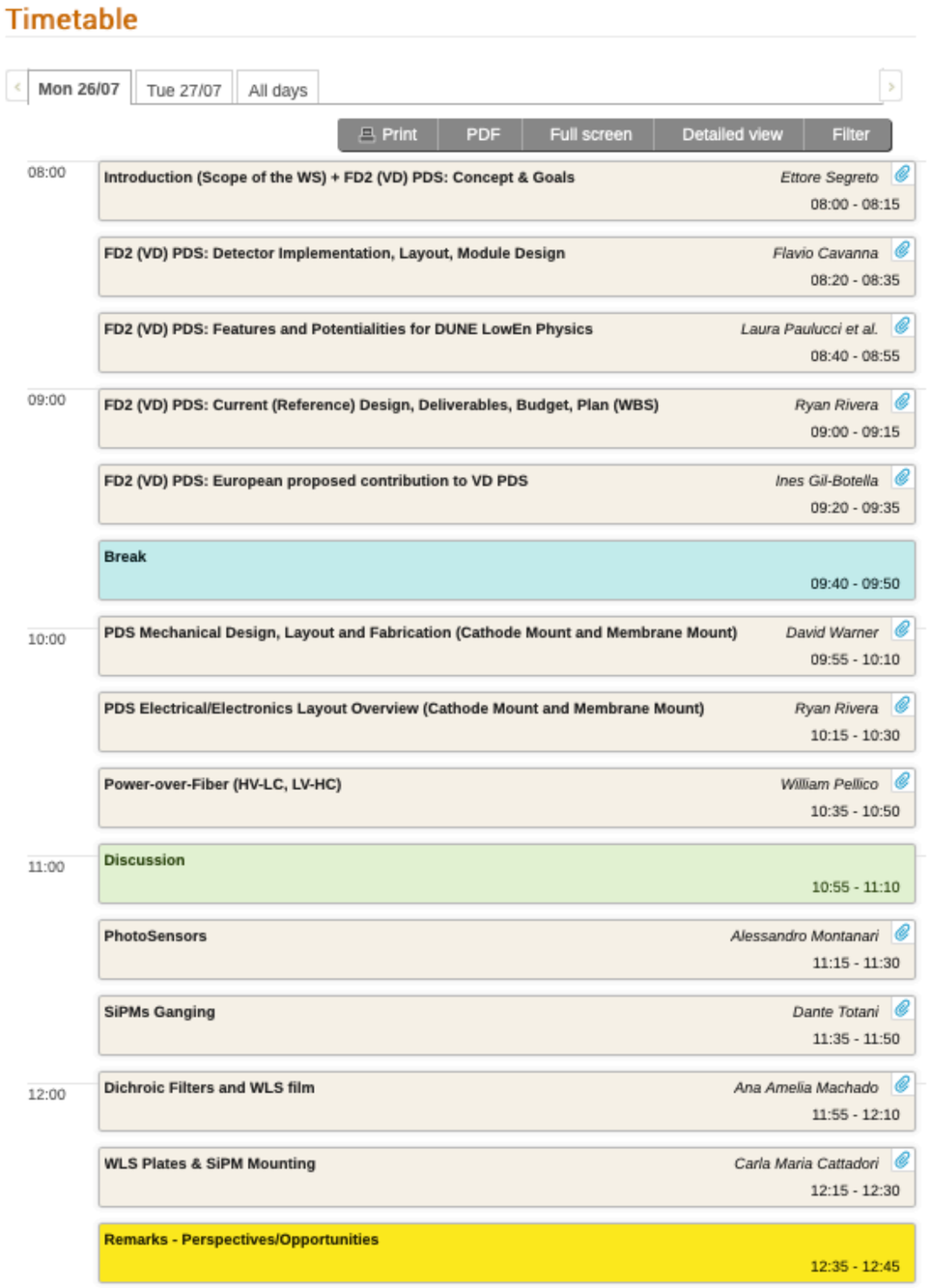
many (25) grps/individuals
non involved
in HD PDS

UICU,
Harvard U,
NASA-JPL,
..

from Zoom Participant List:

≥ 100 Participants on Day-1

≥ 90 Participants on Day-2



VD PDS Concept and Reference design

Organization, Plans

DUNE-US Project Scope
EU proposed (new) contribution

Overview of 3 main VD PDS items
- PhDetector Modules
- Electronics & Transmission (SoF)
- PoF

Cathode Mount
Membrane Mount
(FieldCage Mount option)

Current R&D outcomes (1):

(PhDetector Components)

Activity, Interests and Perspectives from
EU Grps
LA Grps
US Grps

Timetable

Mon 26/07 | **Tue 27/07** | All days

Print | PDF | Full screen | Detailed view | Filter

08:00	CE Analog Readout & Transmission (Tx&Rx)	*Sabrina Sacerdoti et al.*	08:00 - 08:20
	CE Digital Readout Transmission (Tx&Rx)	*Alan Prosser*	08:25 - 08:45
09:00	Immersed WE Option (CryoSub)for Digital Readout, Aggregation & Transmissio	*David Cussans et al.*	08:50 - 09:05
	Warm Electronics: (Warm Rx, ADC), DAQ interface		09:10 - 09:25
	Discussion		09:30 - 09:45
10:00	Other Ph.detection Item(s) ?: SiPM readout (at FNAL)	*Paul Rubinov*	09:50 - 10:05
	PDS Monitoring and Calibration System	*Zelimir Djurcic et al.*	10:10 - 10:25
	Break		10:30 - 10:45
11:00	Contributions at NIU	*Vishnu Zutshi*	10:50 - 11:05
	Contribution plans at the University of Iowa	*Yasar Onel*	11:05 - 11:15
	Contribution plans at CSU	*John Harton*	11:15 - 11:30
	Harvard U - Fiber Modulators	*Neil Sinclair*	11:30 - 11:45
	UIUC - GaAs Photovoltaic Laser Power Converters	*Lee Lawrence*	11:45 - 12:00
12:00	Opportunity for Contribution at CINVESTAV (Mexico)	*Marco Ayala-Torres*	12:00 - 12:10
	Opportunity for contributions from UF Rio de Janeiro	*Joao Torres de Mello Neto*	12:10 - 12:20
	Opportunity of Contributions at CTU Prague	*Lukas Fajit*	12:20 - 12:30
	Remarks - Perspectives/Opportunities	*Francesco Terranova*	12:35 - 12:55
13:00	End of the Workshop		12:55 - 13:01

Current R&D outcomes (2):

Electronics Components
SoF
(PoF)

Activity, Interests and Perspectives from
US Grps
EU Grps

Open Items in PDS

Activity, Interests and Perspectives from
US Grps
(connection/sharing with other DUNE Consortia)

Contribution Plans from new
Grps/Institutions

on going High-End R&D
(beyond scope of current 2021-22 R&D phase)

Expression of interest and
opportunity of contribution
from new Institutions

The VD is now FD-2

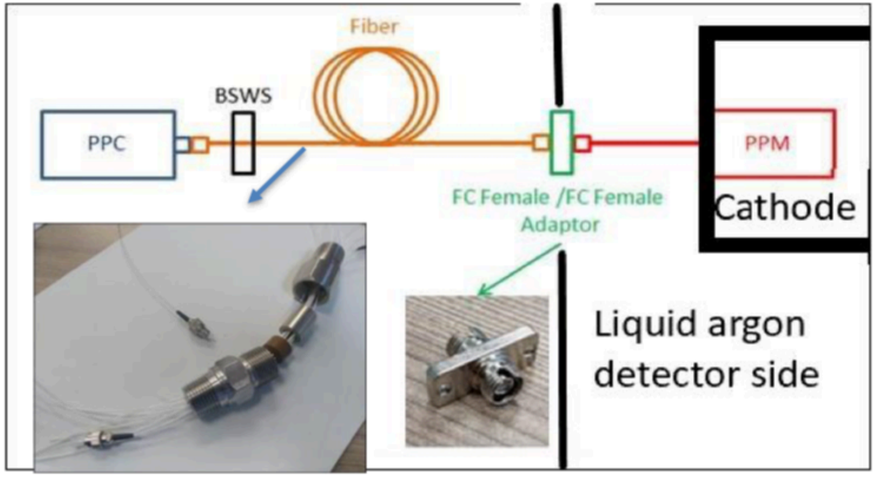
- This activity has been boosted by the decision of employing the VD design as the **reference design for FD-2**
- This workshop marks the start of a new phase in the PDS VD design:
  - ✓ Demonstrate readiness for construction in a timescale consistent with FD-2
  - ✓ Address the most important challenges not validated yet
  - ✓ Perform a test campaign comparable with the one of FD-1 HD.

- The **PDS Consortium** offers the ideal environment because many items have already been addressed for FD-1 and all groups have expertise in light detection in liquid argon.

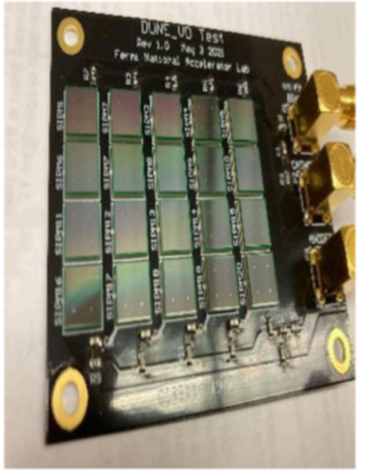
Showed that a substantial, large community (mainly in US, but also in LA, EU and UK) non active in PD HD FD-1 has been formed and included in the PD Consortium when this was expanded from HD into HD+VD

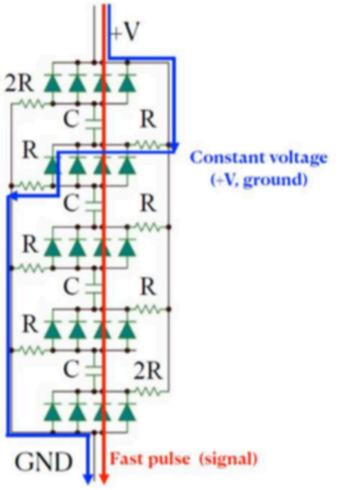
The impressive achievements of the VD R&D

First implementation of a PoF system for particle physics at cryogenic temperature!



W.Pellico @ this workshop





D.Totani @ this workshop

PoF is an emerging technology first time implemented and demonstrated for research/HEP purposes

There are large margins of optimization
(it is the technology of the future)

Smart SiPM ganging is the goal of many. cost saving and optimal signal can be pursued at the same time.

Development done/on-going for VD PDS is at the frontier

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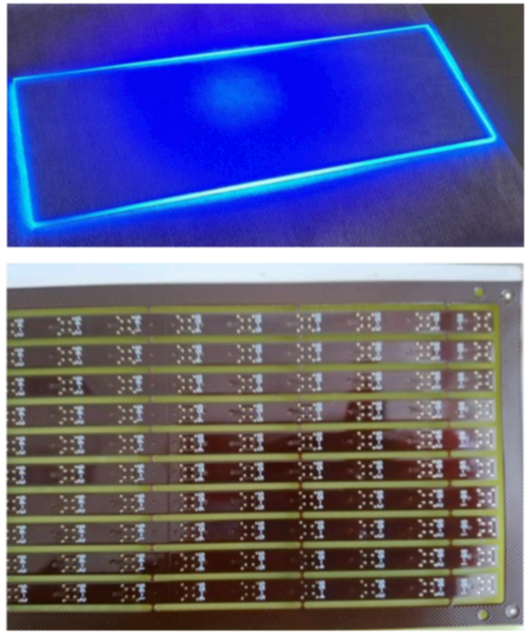
The impressive achievements of the VD R&D



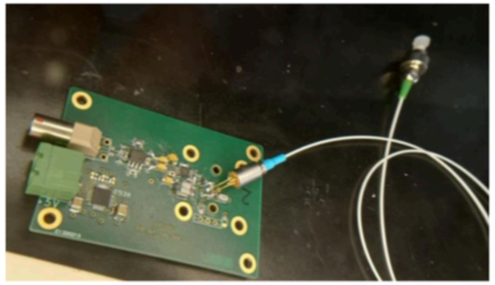
C. Cattadori @ this workshop

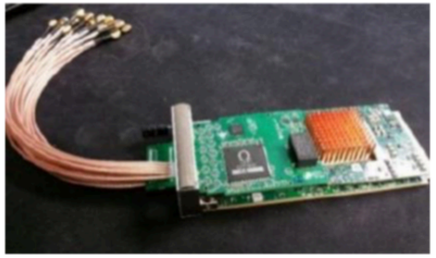
xARAPUCA Technology is now very popular worldwide !

with VD PDS is finding boost to evolve toward further optimization of performance

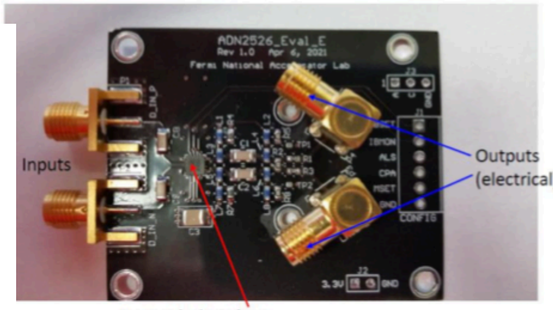
LA (Br) and Eu (Sp, It, ..) grps are motivated to undertake this task

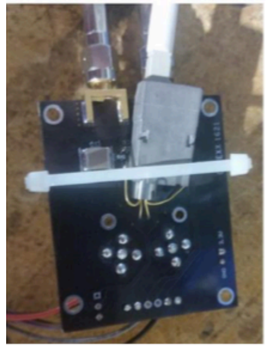
The impressive achievements of the VD R&D



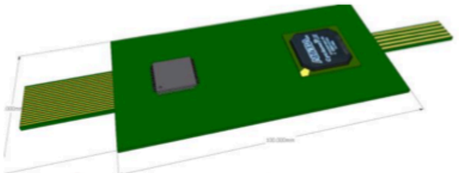


S. Sacerdoti @ this workshop





A. Prosser @ this worskop



P. Rubinov @ this worskop

D. Cussans @ this worskop

Signal Transmission through Fiber (“SoF”) is the main challenge

US (FNAL) and Eu (F) are active and collaborating on this development

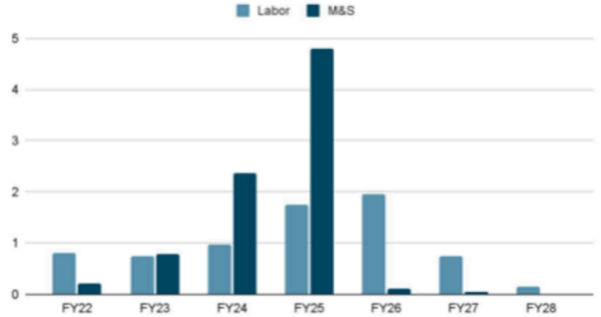
UK is developing a new option

F. Terranova - CONCLUSIONS of Summary Talk

DEEP UNDERGROUND NEUTRINO EXPERIMENT

Have we the know-how and resources to address these challenges?

Judging from what has been presented during this workshop, I would say «yes, we have»:



R. Riveira @ this worskop

- The VD R&D groups are strong and already well ingrained into the Consortium
- The PDS Consortium offers the resource and environment to address R&D, validation and mass production issues
- Strong involvement of European groups (see I. Gil-Botella's talk)
- Strong involvement of US and LA groups with several new DUNE institutions interested in VD
- The physics and technology challenges of VD are interesting even outside the DUNE collaboration and can be pursued in synergy with them

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VD PDS offers expanded Physics Perspectives for DUNE
(from the implementation of the 4pi concept in the Reference design)

It offers opportunity for new technological advance (and the challenge to reach it)

The VD PDS Reference design is
ONE package
with
- Cathode Mount
- Membrane-or-FC Mount
components

Fabrication can be split on different site

Optimization must be pursued individually for both components

Responsibilities should be well identified and distributed internationally

An overall, well defined VD PDS project coordination must be implemented as a first step