# WRAP-UP DAY 1

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SP-PD Preliminary Design Review
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UNICAMP

FAPESP

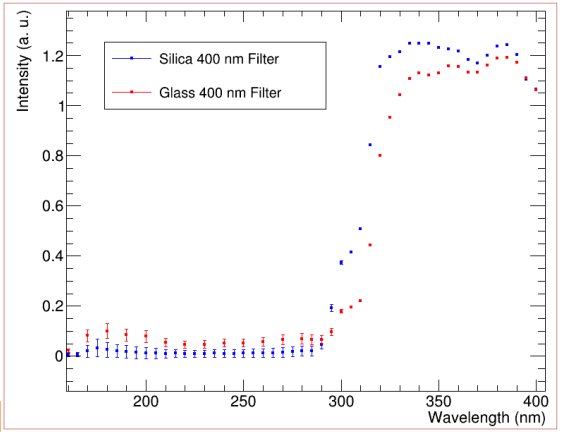
CNPq
Conselho Nacional de Desenvolvimento Científico e Tecnológico

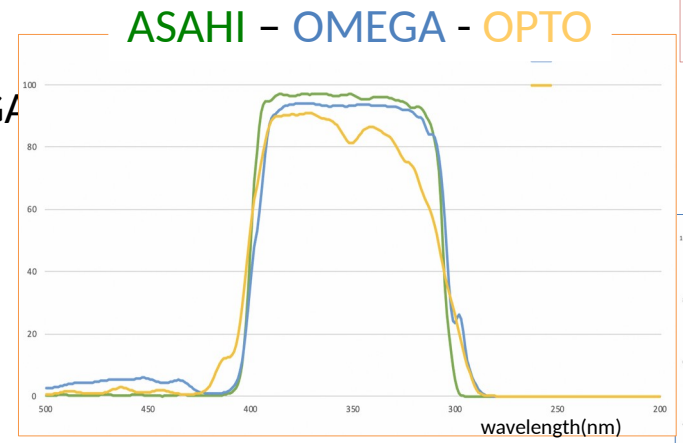
# X-ARAPUCA design

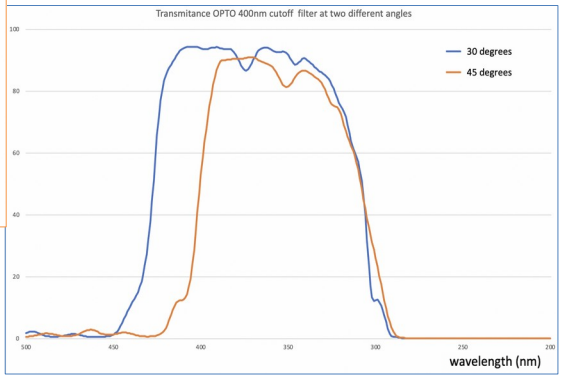
- Connection between physics requirements and detector performances well understood.
- Baseline SPPD design based on X-ARAPUCA is well defined and meets the requirement of our system.
- Great effort in the analysis of ProtoDUNE data. ARAPUCAs showed very good performances and satisfies already most of the requirements.
- X-ARAPUCA validation program slowed down by COVID emergency. Tests on small size prototypes demonstrated a substantial improvement with respect to ARAPUCA. Moving forward towards the test of a supercell.

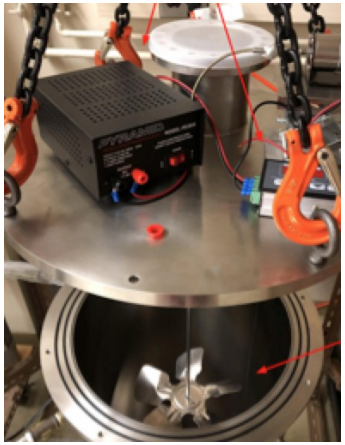
# Dichroic filters

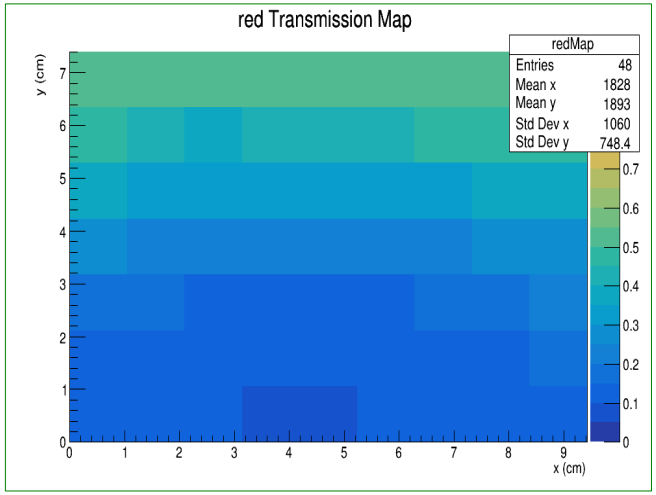
- ***Substrate tests***
  - Fused silica X Optical Glass (B270)
  - Coated Adhesion
- ***Transmittance***
  - Comparison (ASAHI, OMEGA, OPTO)
  - Spectrum at 2 diff angles – OPTO
- ***Scanning***
  - Coated Filter
- ***Next tests***
  - Long term LAr Tests



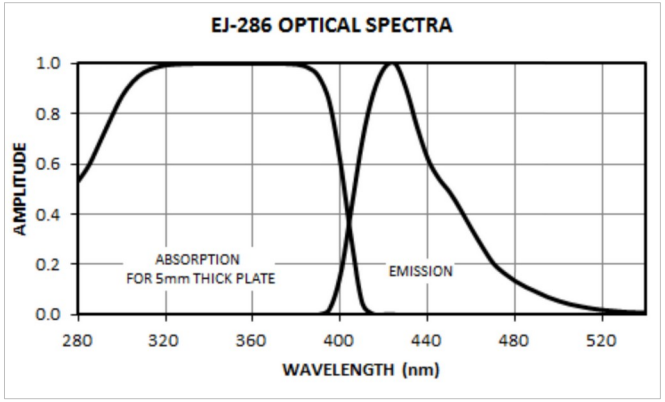



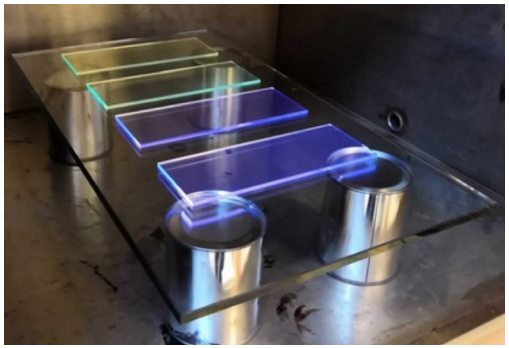



***Baseline for DUNE:***
***Filter produced by OPTO 400nm, with a optical glass B270 substrate.***

# WLS Plates

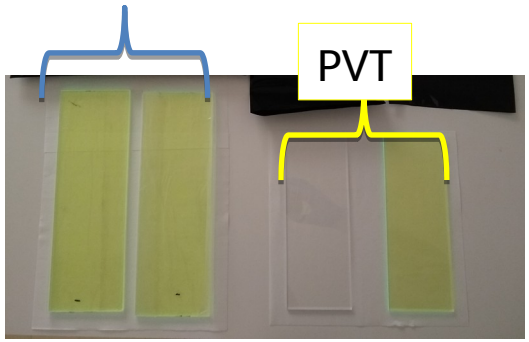
- Tests on ELJEN light bars
  - Immersion in LN2
    - Fast : quick dunk
    - **Slow: 2cm/sec**
  - Annealing (only for PVT)
  - Results from ICEBERG
  - Comparisons among different matrixes: PVT, **Polystyrene** and PMMA

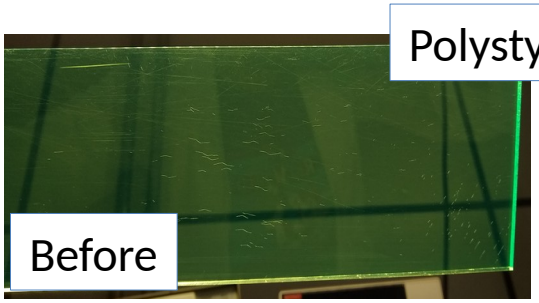


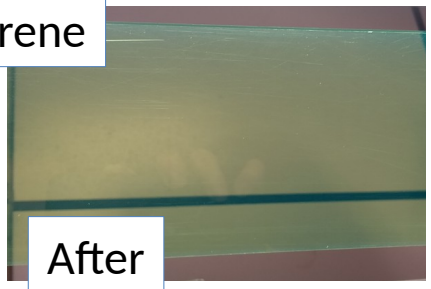



***Baseline for DUNE***

- ***ELJEN (EJ286) comercial Blue emmiting WLS plate***
- ***Peak wavelength 425nm***
- ***Matrix polystyrene***

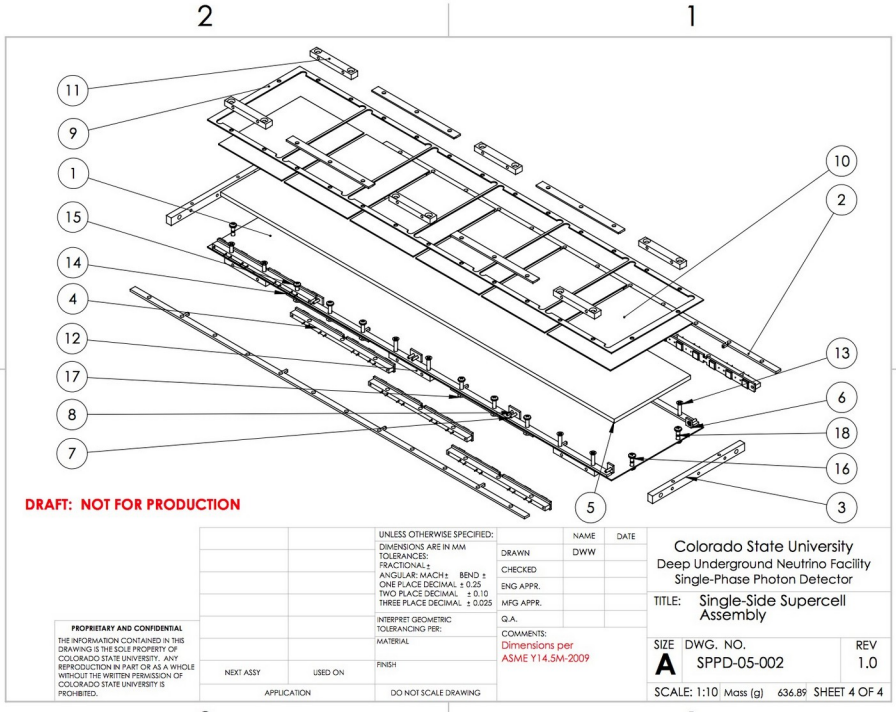


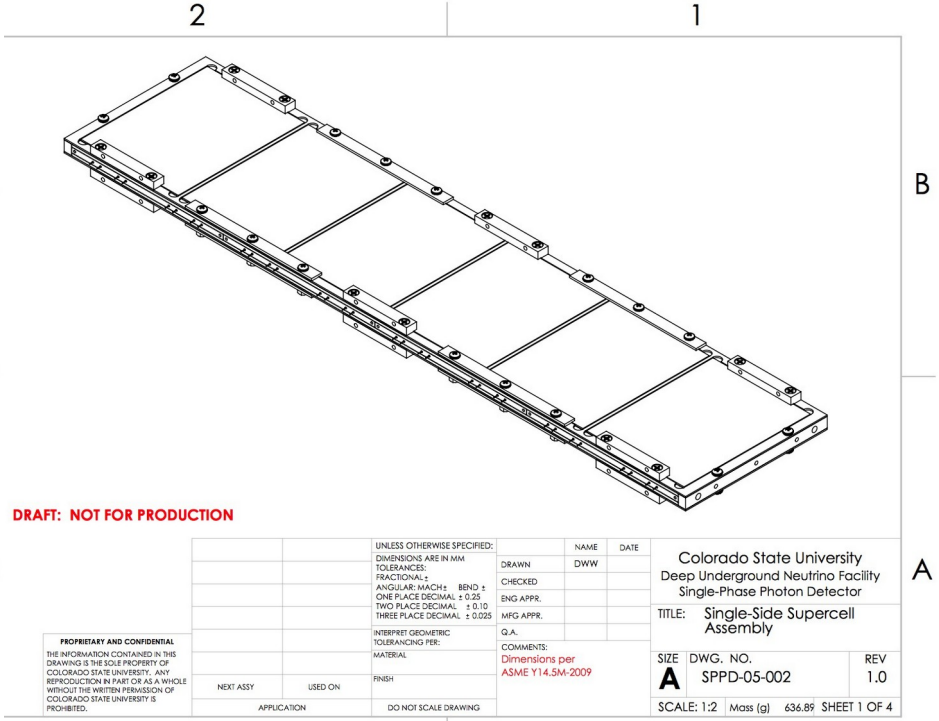



# X-ARAPUCA: Mechanics

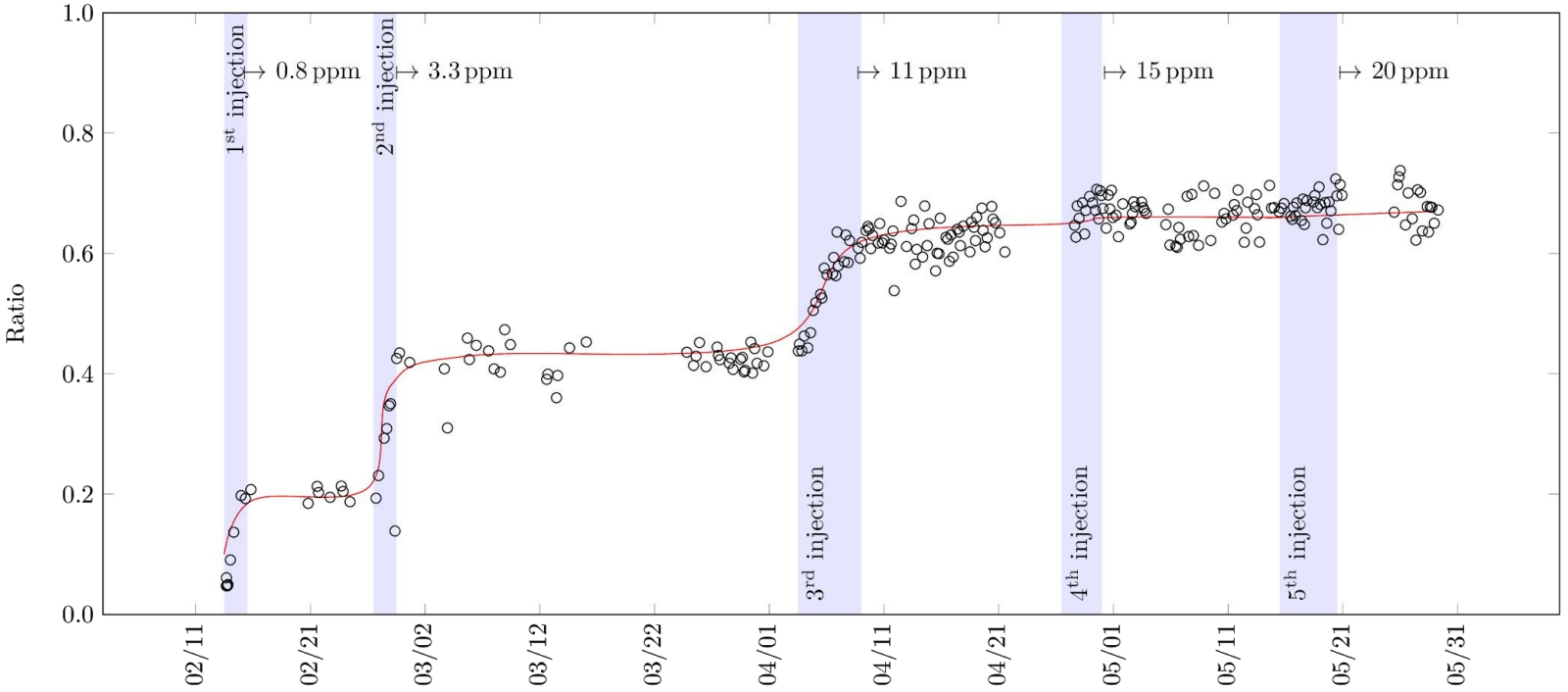
- Mechanical drawings in a well advanced stage. Prototyping will start as soon as possible
- Electrical connections on the APA follow a new design with respect to protoDUNE Run I) which makes the installation easier and connections more robust
- Cable routing\connectors plan developed and awaiting to be tested in Ash River



# X-ARAPUCA: Xe option

- Xe doping test @ protoDUNE opens unexpected and favorable scenarios
- SPPD Consortium is reacting to take advantage if this possibility with a dedicate R&D program




Data
Qualitative trend

$$\text{Ratio} = \frac{\text{Xe light}}{(\text{Ar} + \text{Xe}) \text{ light}}$$

(Ar + Xe) light
↓
ARAPUCA is sensitive to both wavelengths

Xe light
↓
ARAPUCA with a quartz window transparent to Xe light (174 nm) and opaque to Ar light (128 nm)

# DAY 2 program

- Read out System (M. Toups)
  - Cold Electronics (C. Gotti)
  - Warm Electronics (J. Castaño)
- Photosensors (F. Terranova)
- Monitoring System (D. Martinez)
- Cost/Schedule and Installation (D. Warner)
- QC/QA (V. Pimentel)