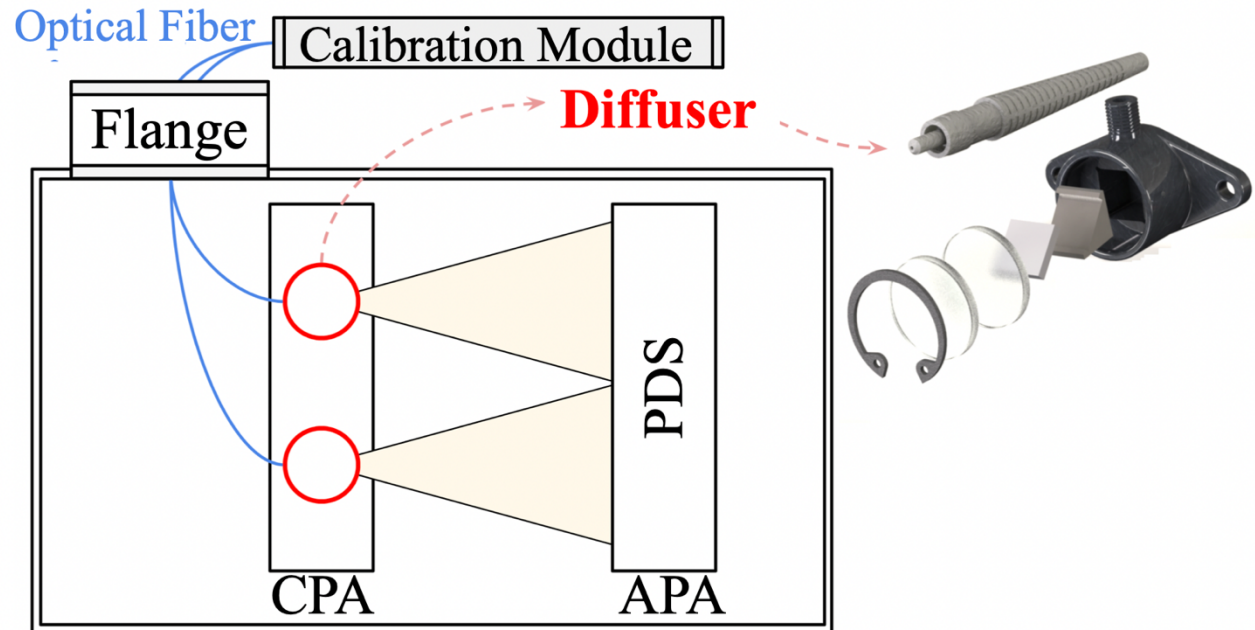# QC/QA Plans for Calibration/Monitoring System

Zelimir Djurcic, David Martinez,
Steve Magill, Aleena Rafique, Patrick DeLurgio, Mike Oberling, Todd Hyden,
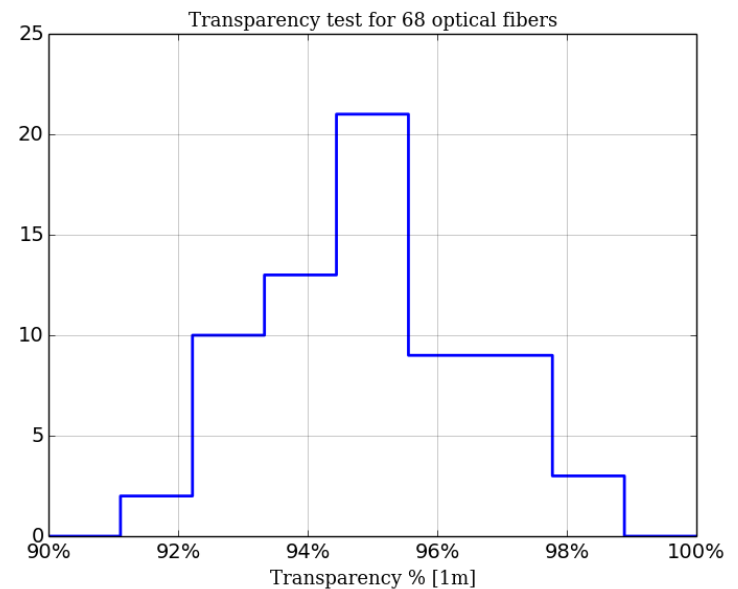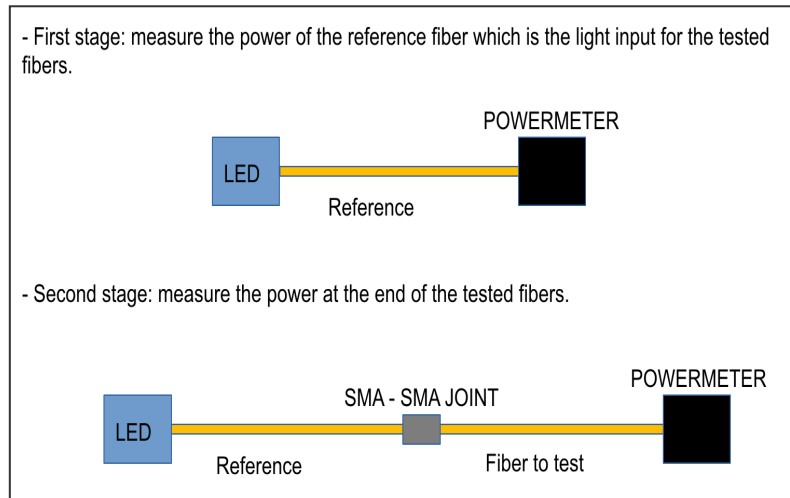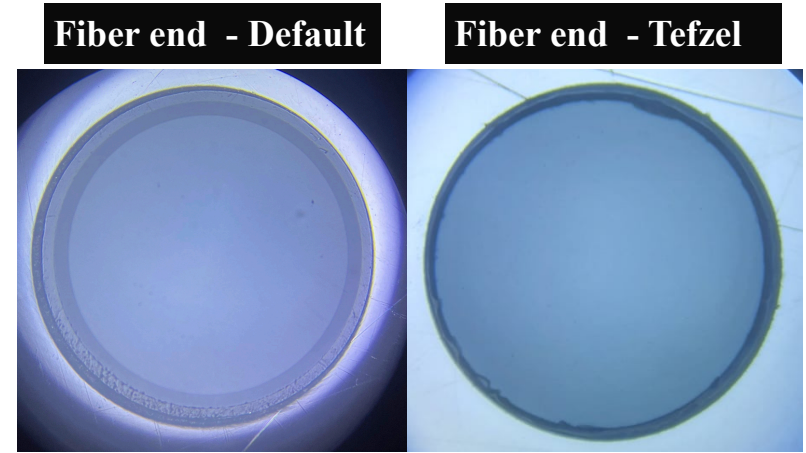Kole Pickner, Ian Helgeson, Diana Leon, Jairo Rodriguez

Nov 15 2022

Schematic of the UV light calibration/monitoring system

Preliminary Quality Control Optical Fibers

Some of the recorded information in lab tests that could be used in ProtoDUNE Run 2. Database:

1) Date manufactured
2) Fiber Type:
   - Default (ProtoDUNE RUN 1)
   - Alternative (Tefzel)
3) Fiber length (before and after assembly SMA connector)
4) Polishing Quality
5) Transparency Test

Fiber end - Default   Fiber end - Tefzel

- First stage: measure the power of the reference fiber which is the light input for the tested fibers.

POWERMETER
LED
Reference

- Second stage: measure the power at the end of the tested fibers.

POWERMETER
LED
SMA - SMA JOINT
Reference   Fiber to test

Transparency test for 68 optical fibers

Transparency % [1m]

Preliminary Quality Control on PEEK 3D printed diffusers

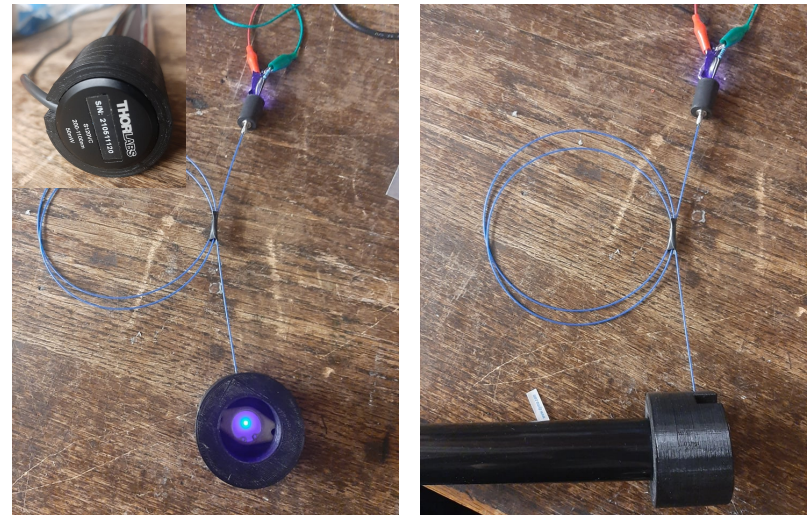- Some of the recorded information in lab tests could be used in ProtoDUNE Run 2

Database:
1) Date 3D printed
2) Dimensions of diffuser
3) Sharp edges removal
4) SMA Fit
5) Mass
6) Light test

PEEK 3D printed diffuser

New single hole design of diffuser

Light Test – Diffuser

Quality Control Optical Feedthrough
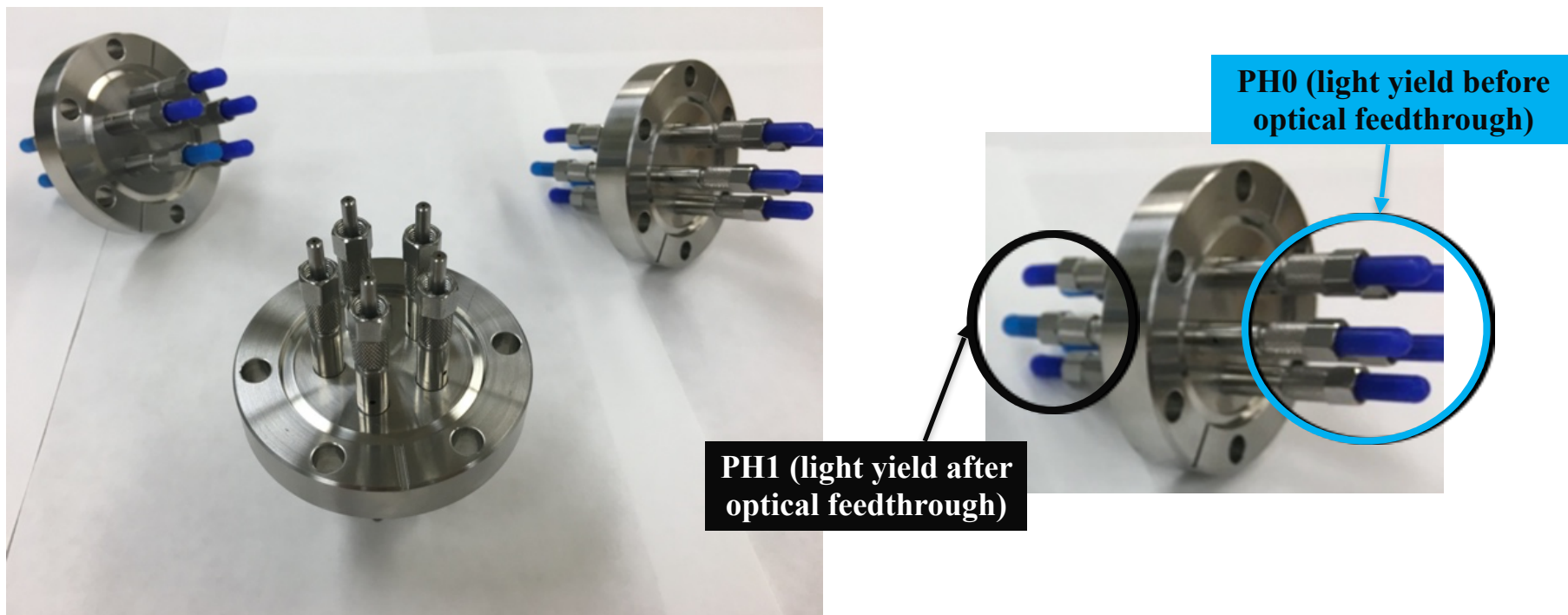
- Optical Feedthrough:

    -The following QC information should be saved in database:

    ID, ch#, PH0, PH1, pulse width used, led bias applied, success (yes/no), date   tested

    Each feedthrough has five channels (1-5)

    - PH0 is the pulse height (light yield) before optical feedthrough.
    - PH1 is the pulse height (light yield) after optical feedthrough.

PH0 (light yield before optical feedthrough)

PH1 (light yield after optical feedthrough)

Quality Control Calibration Module with Light Sources

- Calibration Module with the light source:
  - The following QC information should be saved in database:

  ID, ch#, PH0, PH1, pulse width used, led bias applied, success (yes/no), date tested

  Each calibration module has 12 channels (1-12).
  - PH0 is the pulse height (light yield) from the light source
  - PH1 is the optional test of the light yield in additional configuration
    (will keep this as a placeholder)

Calibration module prototype at CERN

12 channels

Example of the light sources (single channel) within the calibration module