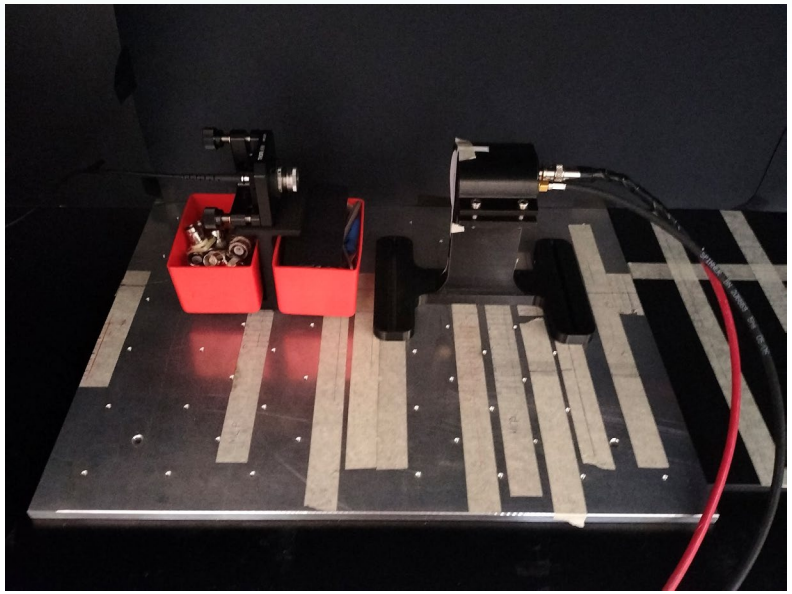
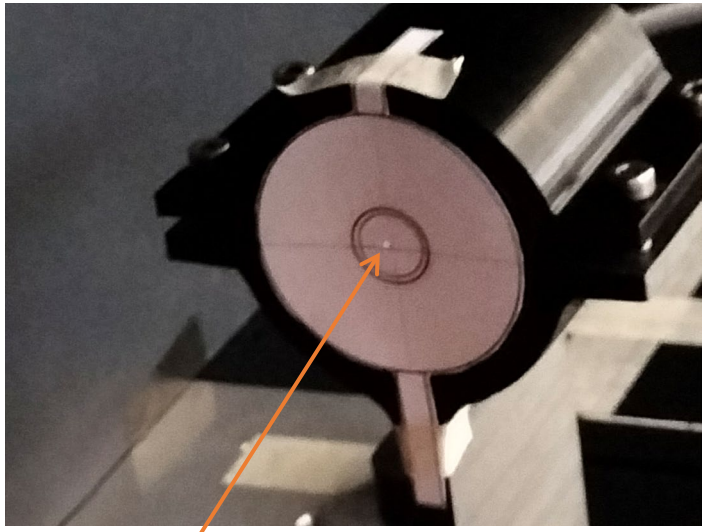
# Rayleigh scan
# 06.07.2026

**Viacheslav Duk, INFN Perugia**

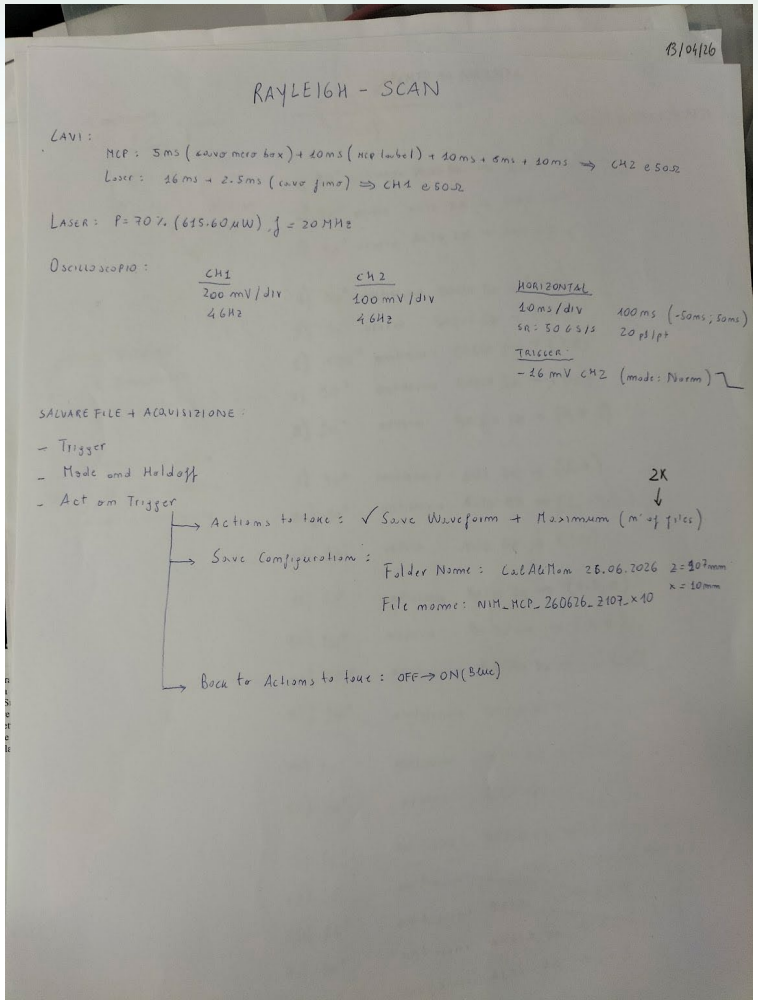
# Beam alignment





Spot within 1 mm (OK)

# Instructions from Chiara for data acquisition




2 scans on X performed

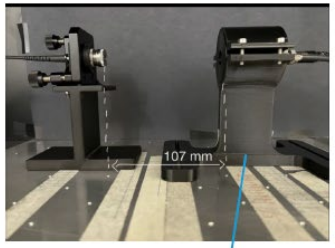
- First: Z = 107 mm
- Second: Z = 350 mm
- Beam dump position: Z=580 mm
- Z=0: collimator exit
- X range: from 0 to 60 mm
- Step in X: 5 mm
- NB X=35 mm for Z=350 mm: MCP PMT was slight moved (to X~33 mm) due to the contact between a signal cable and the black box

More instructions on the next slide

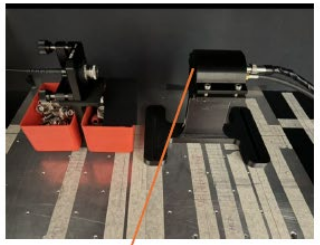
# Instructions from Chiara

## Allineamento fascio

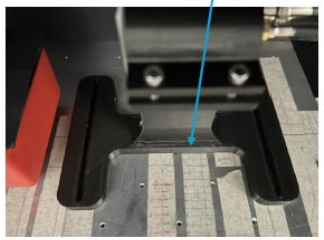
Prima di fare lo scan Rayleigh controllare l'allineamento del fascio usando il «cappuccio» per l'MCP PMT, P(laser)=100%

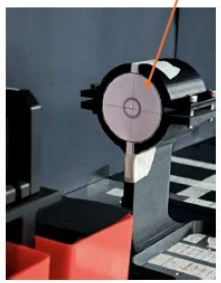



Se non sono già presenti, posizionare le due scatole arancioni sopra il piedistallo del supporto della fibra del laser per aumentarne la stabilità



Usare la linea blu 1 cm come guida per la posizione orizzontale

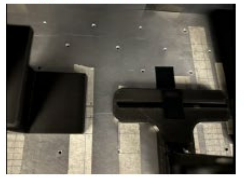


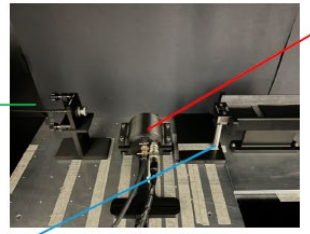


Cerchio interno rosso: d=11mm
Cerchio interno nero: d=13mm
Cerchio esterno nero: d=45mm

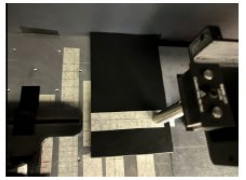
## Scan Rayleigh

1 Posizione supporto fibra laser



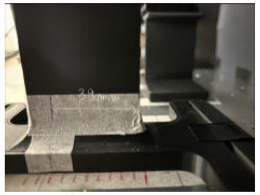


2 Posizione trappola laser

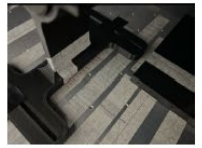


- La trappola non operava in modo corretto perché dava delle riflessioni. Scegliere se tenerla oppure no. Si potrebbe spostare più downstream per avere i picchi di riflessione più separati in tempo rispetto al picco principale oppure rimuoverla e usare un cartone nero o una coperta nera (forse quella usata per i SiPM?)

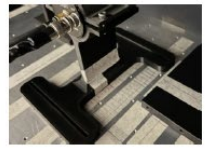
3 Posizione MCP PMT trasversale al fascio:



- L'LMCP PMT deve essere orientato a 90° rispetto al fascio in uscita dalla fibra e posizionato lungo le linea rossa (distante 107 mm dal punto di emissione della luce).
- Ogni tacca sulla linea rossa sono 5 mm
- La distanza tra la faccia dell' MCP-PMT e la tacca riportata sul lato sono 39 mm.
- Per posizionare l'MCP PMT a x=0mm z=107mm usare la prima tacca rossa spessa che si trova a 40 mm dallo 0 del fascio.

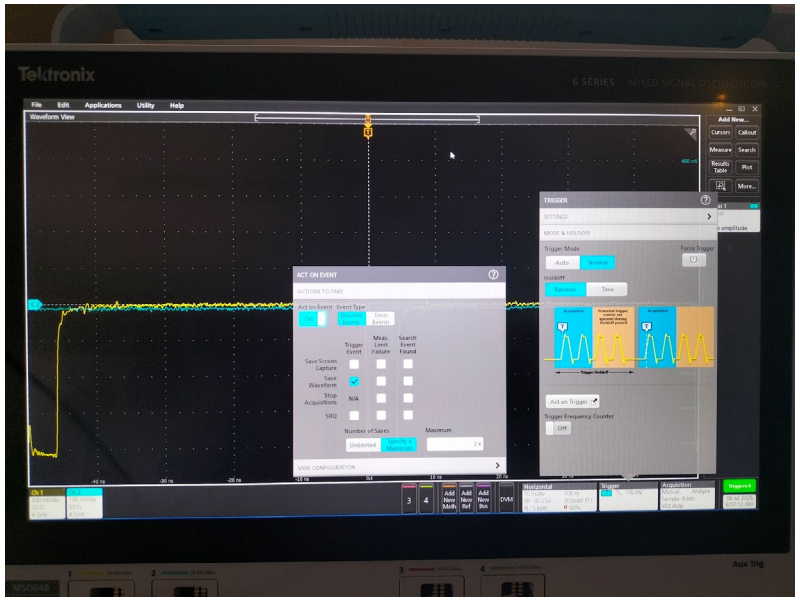


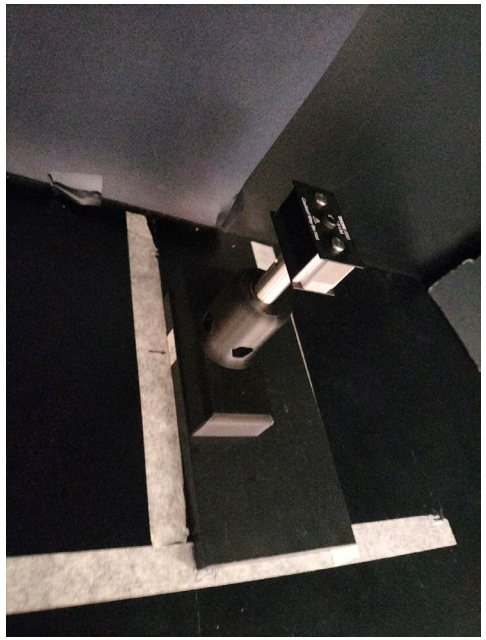
Es: x=40mm, z=107mm



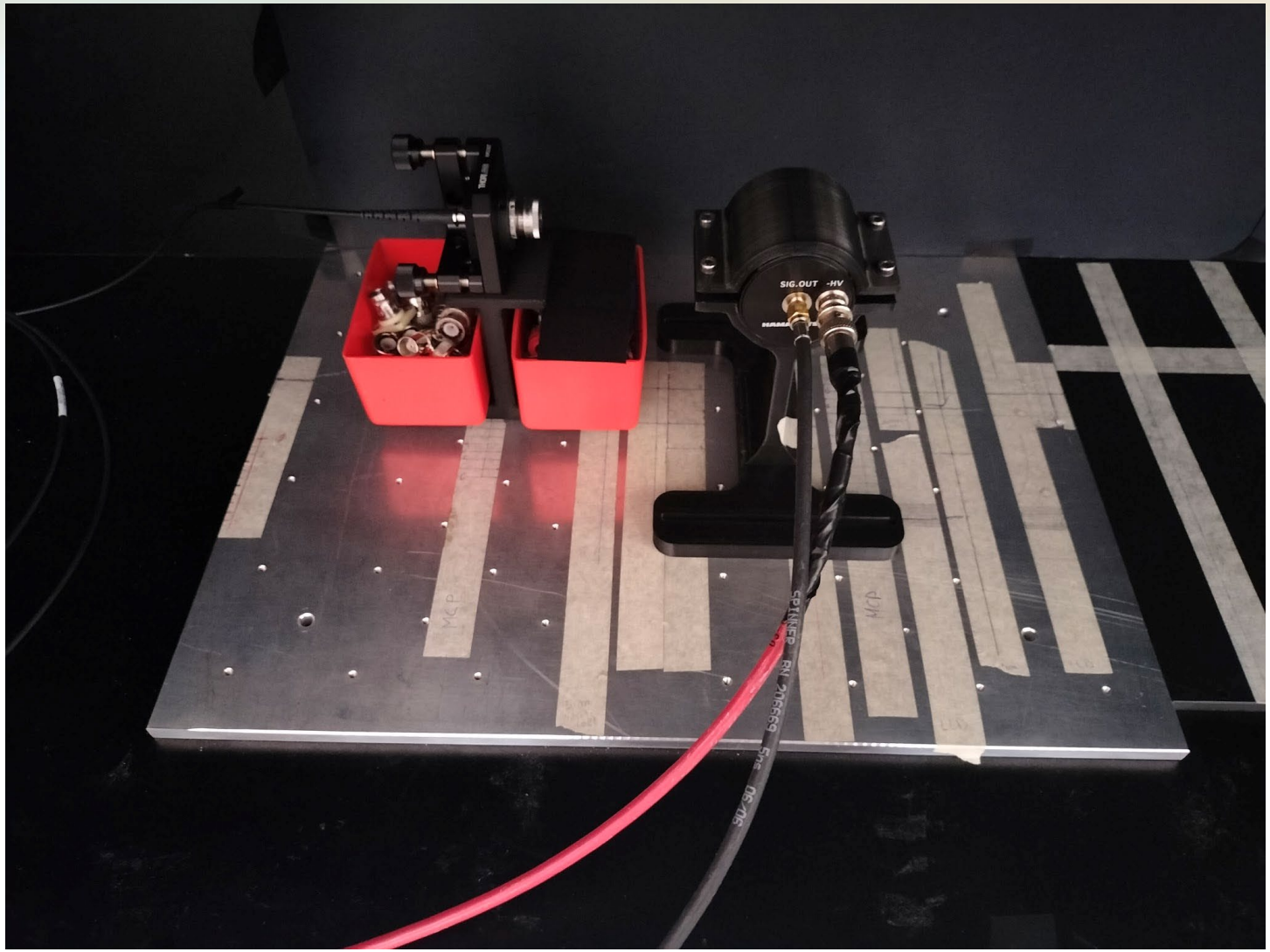
Es: x=10mm, z=107mm

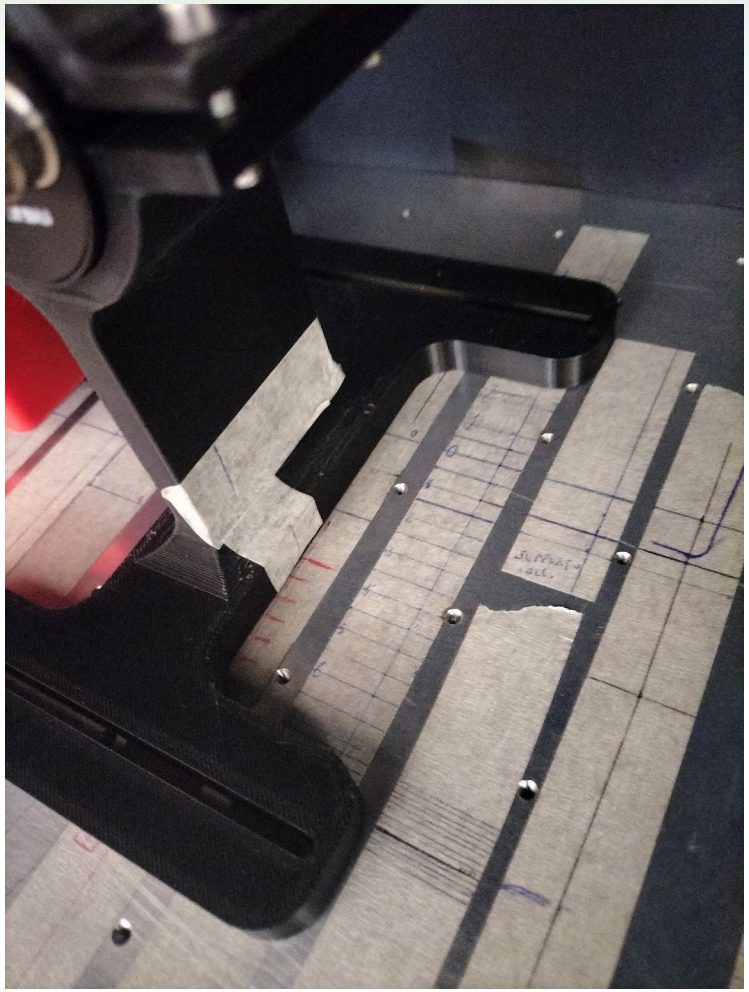
# Laser, scope, beam dump



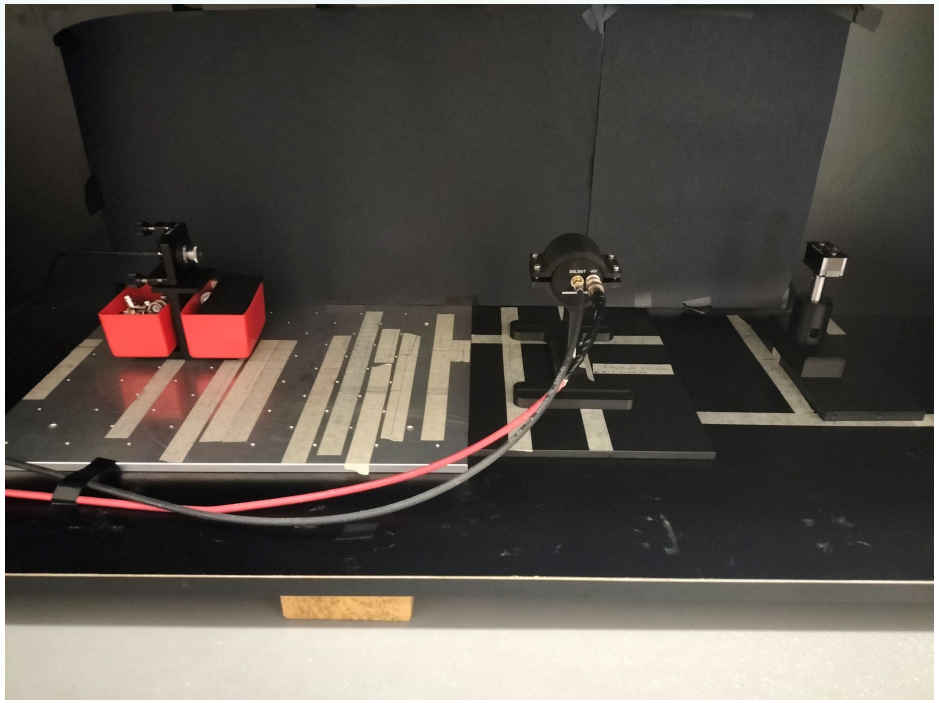



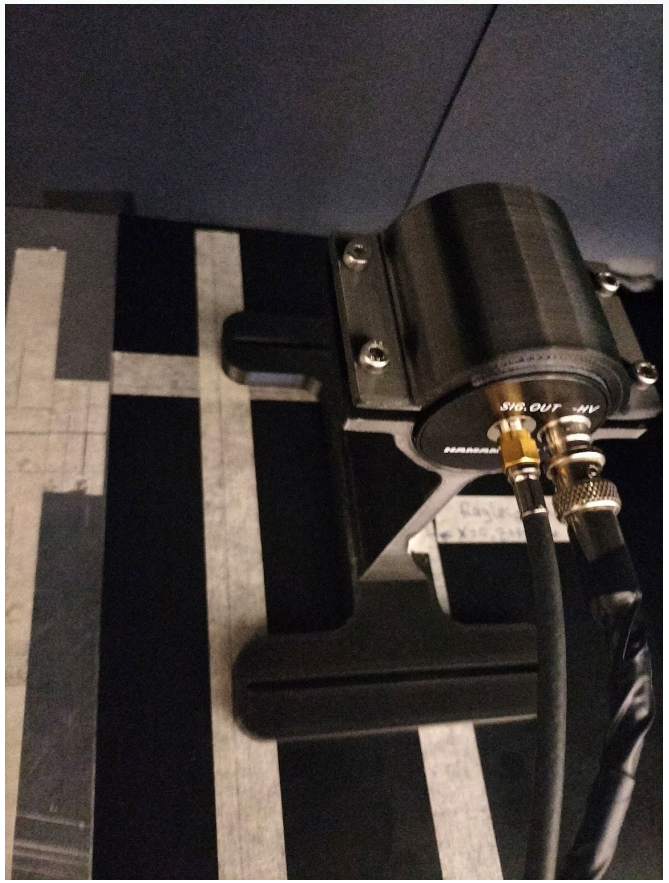
# Scan at Z=107 mm

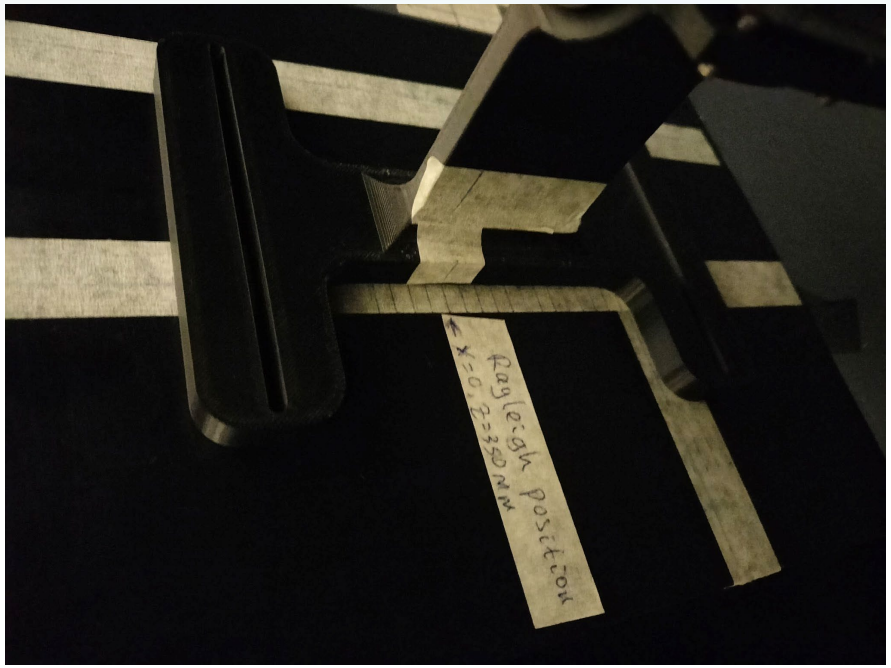


# Scan at Z=350 mm





# Elog

06/07/2026 Rayleigh scan V. Duk

① Allineamento fascio

laser | collimator | MCP PMT

P=100%
20 MHz

107 mm

Beam spot entro 1mm dal centro

② Scan su X, z = 107 mm

580 mm

laser | collimator | beam dump

107 mm

MCP PMT

X = 0, 5, 10 ... 60 mm
2k evt per ogni posizione
tempo di acquisizione cambia da 2 min a 5 min e dipende da X

Cavi laser 16 ns + 2.5 ns → ch1 @50Ω
MCP PMT 5ns+10ns+10ns+8ns+10ns → ch2 @50Ω

laser: P=70% (615.6 μW) f = 20 MHz

Scope ch1 200 mV/div, 4GHz
ch2 100 mV/div, 4GHz
horizontal 10 ns/div, range -50ns ÷ 50ns
50 GS/s

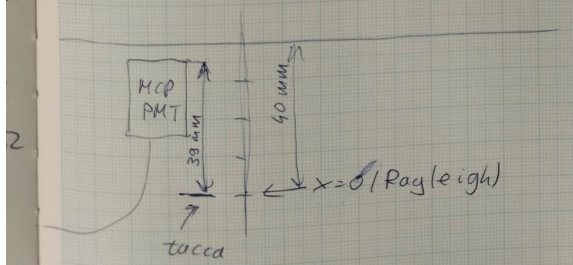
③ Scan su X, z = 350 mm

NB X=35 mm non è accurata:
l'MCP PMT è stato mosso a X ~ 33 mm dopo la chiusura della scatola nera (dovuto al contatto tra la scatola e il cavo di segnale)

tempo di acquisizione: 3 ÷ 7 min

Ho usato la scala per la misura del profilo, quindi c'è un offset di 1 mm

X=0 (Rayleigh) corrisponde a X=40 mm "MCP PMT sul fascio", ma la distanza tra una tacca e la superficie dell'MCP PMT è 39 mm



# Spare