Test of two different fiber & mirror painting

Fibers were fixed on the light spot

Mirror painting or nothing

Test in the dark room

For laser source:
- 420-1100 nm
- 1 MHz

For SiPM:
- Gain: $1.76 \times 10^5$
- $1.408\text{pWb}=1\text{pe}$
- Voltage=23.0 V

For the fibers:
- 50 cm
- Have been polished

Get the data of Npe

Waveform sampling oscilloscope

Laser source

SiPM + Preamplifier

WLSF

Light spot

Trigger

WLSF (Y11)

WLSF (BCF91A)

WLSF (Y11) + silver shine 415001

WLSF (BCF91A) + silver shine 415001
Set up
Gain of the SiPM (SPE)

Gain
\[
\frac{(\text{Center}_2 - \text{Center}_1) + (\text{Center}_3 - \text{Center}_1)/2}{2 \cdot 100 \cdot R \cdot e} = \frac{140.2\text{pvs}}{100 \cdot R \cdot e} = 1.76 \times 10^5
\]

Preamplifier

50Ω for oscilloscope

140.2pvs = 1PE
BCF91A (no mirror painting)  

\[ 1 \text{nWb} = 1000 \text{pVs} \]

\[ N_{pe} = \frac{3337.1 \text{pVs}}{140.2 \text{pVs}} = 24 \]
BCF91A + silver 415001

\[ N_{pe} = \frac{4712.9}{140.2} = 34 \]
Y11 (no mirror painting)

\[
N_{pe} = \frac{3437.4}{140.2} = 25
\]
Y11 + silver 415001

\[ N_{pe} = \frac{4687.2}{140.2} = 33 \]
## Compared results

<table>
<thead>
<tr>
<th></th>
<th>BCF91A</th>
<th>Y11</th>
<th>improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>No mirror painting</td>
<td>24</td>
<td>25</td>
<td>?</td>
</tr>
<tr>
<td>Silver 415001</td>
<td>34</td>
<td>33</td>
<td>?</td>
</tr>
<tr>
<td>improvement</td>
<td>41.67%</td>
<td>32%</td>
<td></td>
</tr>
</tbody>
</table>

- Y11 (maybe it is not Y11, it is BCF91A, please check)
- BCF91A (We buy this kind of fiber from SAINT-GOBAIN)