

Light calibration system update

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Design

- 6 Bundles 1-to-7 from Thorlabs
 - SMA connectors at both ends
 - 200UEA fiber
 - 20 m together and 4 m separated,
 - FT05SS at common end, FT030 at split
- Flange from Allectra:
 - 2 x 40CF with 3 feedthroughs each (female if ok for vacuum)



Results - x7 bundle

• LED + PM:

46.3 μ W

• LED + x7 bundle + PM:

(av.) 6.46 +/- 0.56 μ W

(stev) 9%

(Att.) 10^{-4}

1	6,17 μ W
2	6,24 μ W
3	6,04 μ W
4	6,15 μ W
5	7,54 μ W
6	6,15 μ W
7	6,92 μ W

-> Central fiber

-> LED anisotropy?
to be checked

Excellent light
uniformity

Results - x20 bundle

- LED + PM: 48.0 μW
- LED + x20 bundle + PM: (av.) 0.477 +/- 0.134 μW
(stev) 28%
(Att.) 10^{-5}

1	0,29 μW
2	0,74 μW
3	0,55 μW
4	0,5 μW
5	0,4 μW
6	0,35 μW
7	0,61 μW
8	0,19 μW
9	0,49 μW
10	0,39 μW
11	0,59 μW
12	0,45 μW
13	0,63 μW
14	0,5 μW
15	0,64 μW
16	0,51 μW
17	0,4 μW
18	0,34 μW
19	0,41 μW
20	0,56 μW

Worse Light
uniformity

Results - x7 bundle (Laser)

- Laser + PM: 22.77 mW
- Laser + x7 bundle + PM:

1	4.49 mW
2	4.95 mW
3	40 μ W
4	282 μ W
5	907 μ W
6	568 μ W
7	867 μ W

-> Central fiber

Laser does not
provide uniform
light

Also observed with x20 bundle

Results - 200 μ W fiber + x7 bundle

- LED + fiber + PM: 1.56 μ W
- LED + fiber + x7 bundle + PM:

1	1.29 μ W	-> Central fiber
2	0.062 μ W	
3	0.064 μ W	
4	0.060 μ W	
5	0.062 μ W	
6	0.062 μ W	
7	0.066 μ W	

A 200- μ W fibers does not provide uniform light

Next measurements

- x7 bundle @ Cryo T
- LED + 600 μm /800 μm fibers + x7 bundle + PM
- LED + Fiber + PMT \rightarrow Different fiber positions, studying SPE shape

Report

Light calibration system testing @ CIEMAT

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Conclusions

- Design: 6x 1-to-7 bundles
2x CF40 with 3 feedthroughs each
- Testing results: 1-to-7 bundle provides homogeneous light with hom. Light input
- Next: tests at CT, with PMT and 600/800- μm fibers