UV LED quality test

All 872 UV LEDs testedSelection is about to finish

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Measurement setup

•LED Driver pulses – UV LED – opt. fibers – APD – preamp – scope

Measured by scope of 4 channels/fibers for each LED (semi-automatic procedure)
@ different positions (diff radius: 0.58, 1.15, 1.76 mm) wrt. central LED point





- Light source asymmetric wrt. LED central point
 Phi response variations
- Zero angle position uncertainty
 ➢ reproducibility ≥ 5%

Angle Anisotropy Zero position setup uncertainty

UV LED (400nm) characteristics



UV LEDs Response – full sample 872 LEDs (I)

after light calibration and temperature corrections



UV LEDs Response – full sample 872 LEDs (II)

- response normalized to the average over all LEDs (summed up all fibers)
- visible decrease of response for beginning of data taking
- but not correlated with LEDs themselves \rightarrow



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McGill Uni, Montréal, Québec, CA





Selection criteria

Preliminary: only "constant" part i.e. 532 LEDs

within range of ±15% 82% of LEDs
RMS = 13%

additional (redundant) criteria: variation range for each fiber

LED #	koef	100%	±20 %	± 15 %	± 10 %	±5%
	RMS		1.5	1.35	1.22	1.11
all	1.000	872	773	650	498	260
	13.1%	100.0%	88.6%	74.5%	57.1%	29.8%
6401179	0.955	532	498	434	309	176
	12.7%	100.0%	93.6%	81.6%	58.1%	33.1%

Conclusion

□ All UV LEDs (872 in our hands) were tested

"no name" leds look reasonable!
 in general: LED light emission show same characteristics -> similar behavior

□ decrease of response @ first measured leds is probably due to instability of the measured equipment (aging,..) than degradation of light of LEDs themselves
 → apply correction for each channel/fiber with function of const + slope line
 □ main selection criterion based on led light variation being within range ± 15%
 → in 'const' sub-sample of 532 leds 82% satisfied ↔ 1.35 highest/lowest emission

For entire LED system the PINs watch of LED response important to keep its time and temperature stability

distribution of one LED light into single fibers (up to 100% of lowest->highest yield) rather important than overall variation of light among leds