Light transmission test status
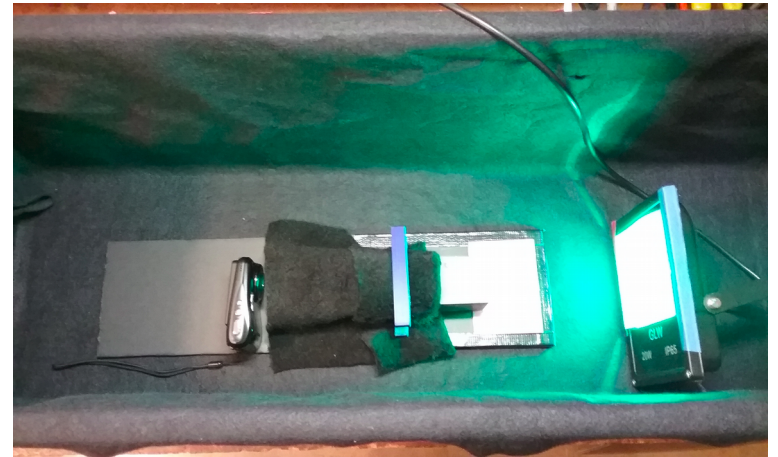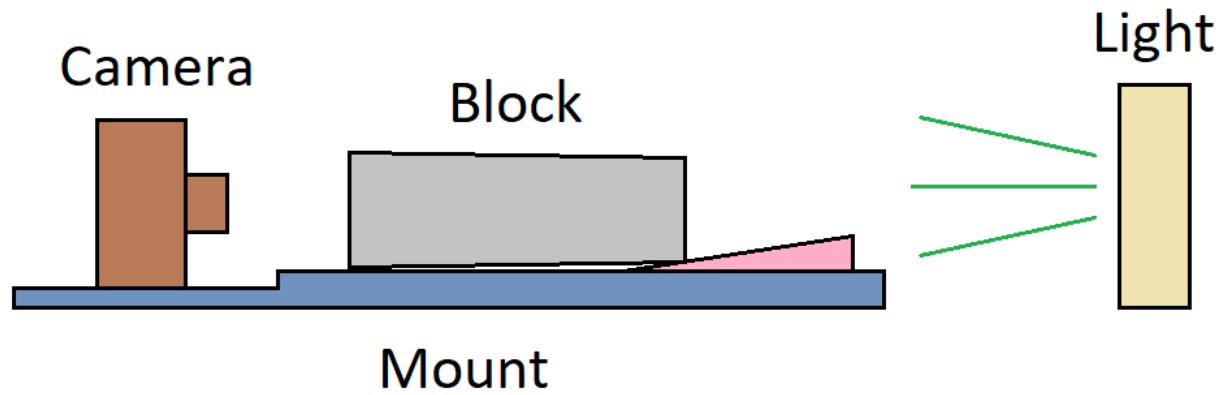
Anabel Romero Hernandez, Yongsun Kim
October 17, 2017

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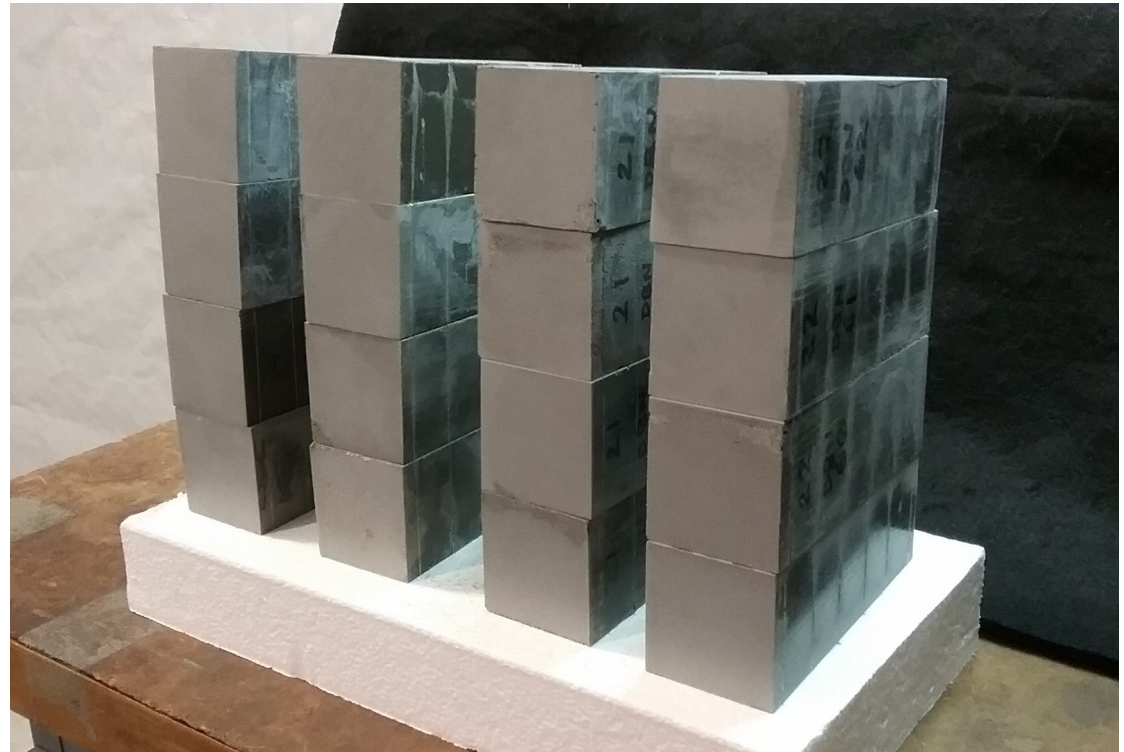UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN
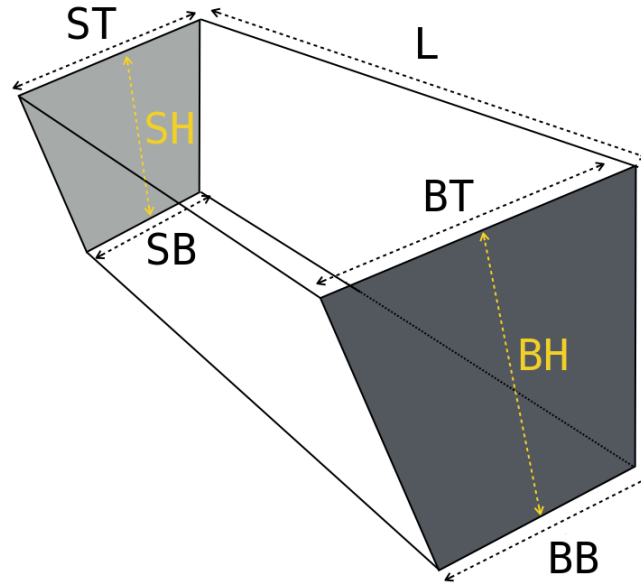1867

Previously

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What's new?

- New blocks:

  We have 4 blocks of types 19, 20, 21 and 22.

  Total = 16 blocks.

- Tolerances.

- Increased distance between camera and block.

- Total number of fibers for some of the blocks.

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Tolerances

Nominal values:

Block type	L (in)	BT (in)	BB (in)	BH (in)	ST (in)	SB (in)	SH (in)
19	5.342	2.085	2.020	2.157	1.875	1.815	1.989
20	5.412	2.085	2.018	2.152	1.877	1.815	1.989
21	5.489	2.085	2.015	2.147	1.879	1.815	1.989
22	5.572	2.085	2.013	2.142	1.881	1.815	1.989

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Tolerances

$$\Delta = (real) - (nominal)$$

Block type	DBN	ΔL (in)	ΔBT (in)	ΔBB (in)	ΔBH (in)	ΔST (in)	ΔSB (in)	ΔSH (in)
19	1	0.003	-0.012	-0.011	-0.024	-0.006	-0.013	-0.022
	7	0.003	-0.026	0.003	-0.009	0.005	0.028	-0.007
	49	-0.005	-0.007	-0.004	0.009	-0.006	0.001	-0.004
	50	0.002	-0.006	0.005	-0.002	0.010	0.014	0.000
20	10	-0.026	0.013	0.037	-0.002	0.007	0.033	0.016
	53	0.006	0.012	0.011	-0.016	0.018	0.021	-0.011
	54	0.002	0.008	0.011	-0.020	0.009	0.013	-0.015
	56	0.040	0.007	0.013	-0.001	0.012	0.018	-0.010
21	6	0.003	-0.010	0.015	-0.002	-0.004	0.025	0.009
	52	0.005	-0.013	0.005	-0.007	0.015	0.027	-0.006
	57	-0.001	0.001	-0.002	-0.010	-0.008	0.004	-0.009
	59	0.007	0.009	0.020	-0.002	0.006	0.007	-0.010
22	3	0.003	-0.011	0.010	-0.005	-0.004	0.010	-0.001
	60	0.003	-0.004	0.010	-0.004	-0.007	0.003	-0.013
	61	0.003	-0.003	0.004	-0.009	0.001	0.003	0.001
	62	-0.019	-0.003	0.003	-0.008	0.002	0.008	-0.004

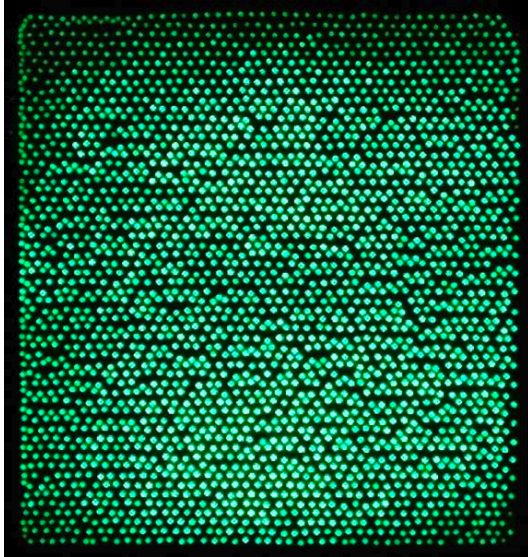Green: too long.   Blue: too short.   Black: within tolerance.

We are looking into the blocks type 20, some can be trimmed to match the tolerance.

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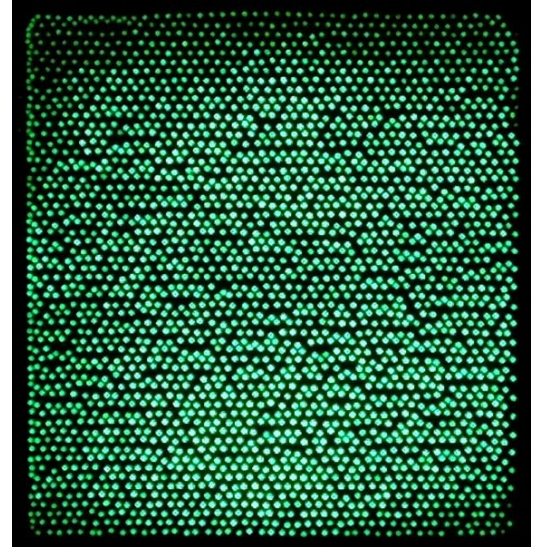UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Distance camera-block
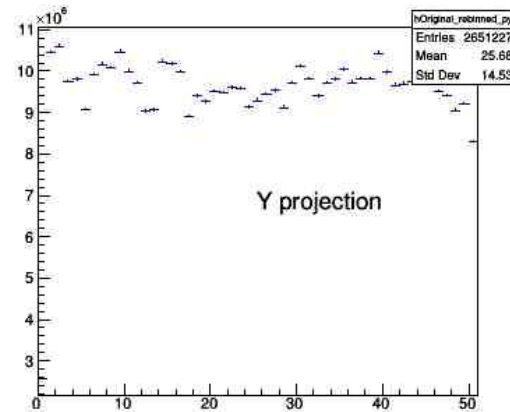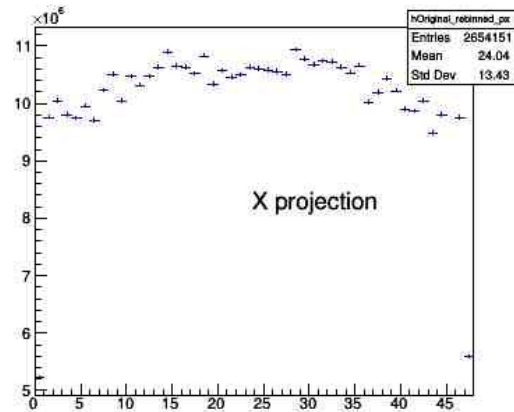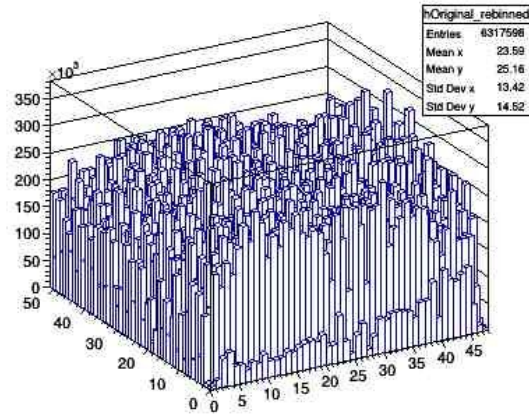
Block: DBN 61 (wide end)

Old camera
Distance: 10 cm

Old camera
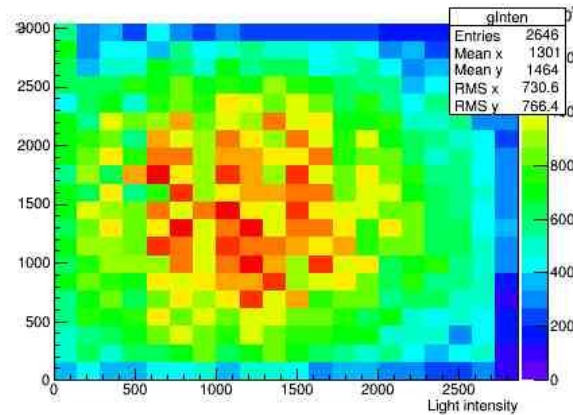Distance: 50 cm

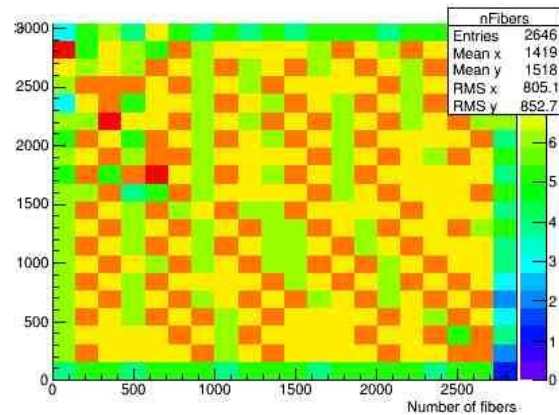New camera
Distance: 50 cm

2D distributions

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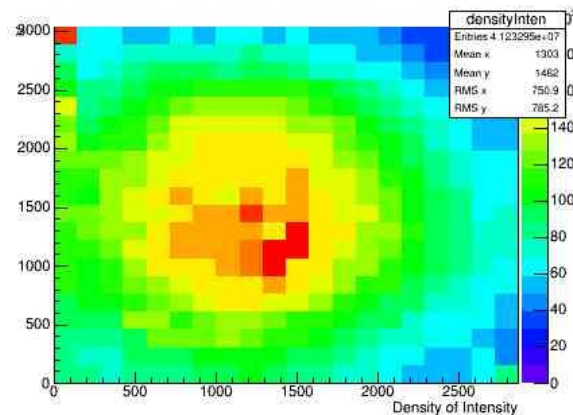
2D distributions for camera-block distance ~10 cm

Block:
DBN 61
(wide end)

Light intensity

Number of fibers

Density of intensity

Number of pixels per fiber

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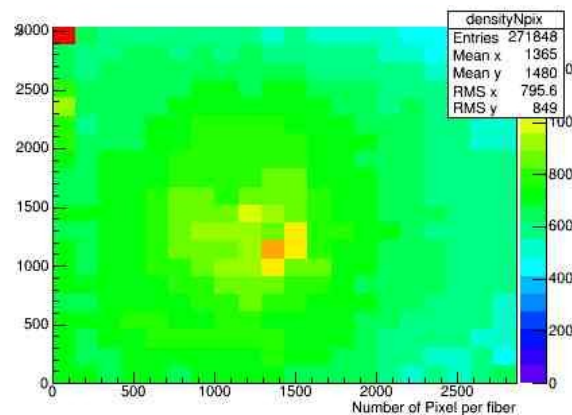# 2D distributions for camera-block distance ~50 cm

Block:
DBN 61
(wide end)

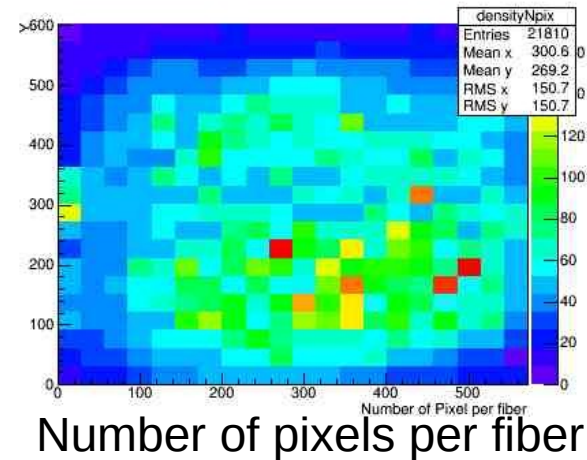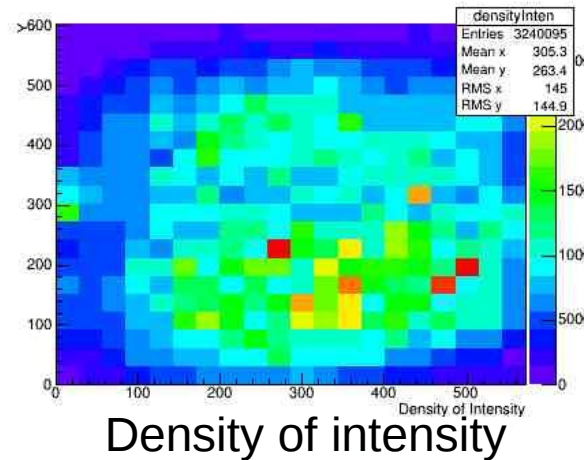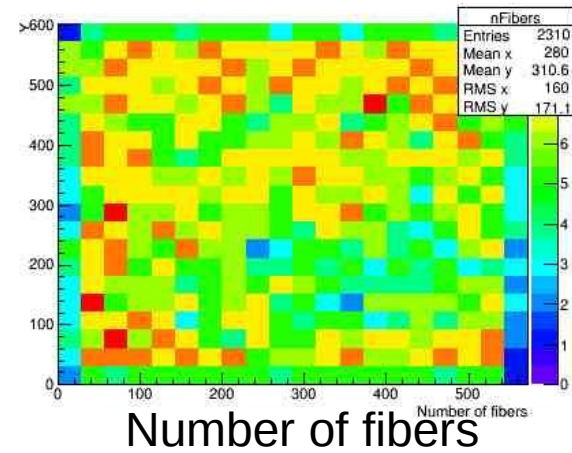Light intensity

Number of fibers

Density of intensity

Number of pixels per fiber

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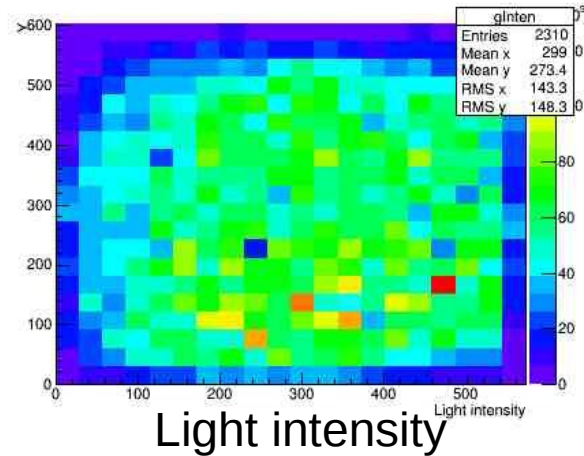
Total number of fibers

DBN	Block type	# Fibers (wide)	# Fibers (narrow)	Difference (%)	Average efficiency
1	19	2650	2655	0.2	0.994
50	19	2646	2635	0.4	0.990
53	20	2650	2613	1.4	0.985
54	20	2653	2630	0.9	0.990

Average efficiency = Average # fibers / 2668 holes

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Mass/Number of Fibers correlation

Rough analysis for blocks of type 20:

- DBN 53 : 2650 => 3314g
- DBN 54 : 2653 => 3301g
- DBN 56 : 2653 => 3399g
- DBN 10 : 2657 => 3562g

Next

- Final pictures with increased distance camera-block.
- Trim some of the blocks to match the tolerance.
- Total number of fibers for rest of the blocks.
- Ship to BNL.

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