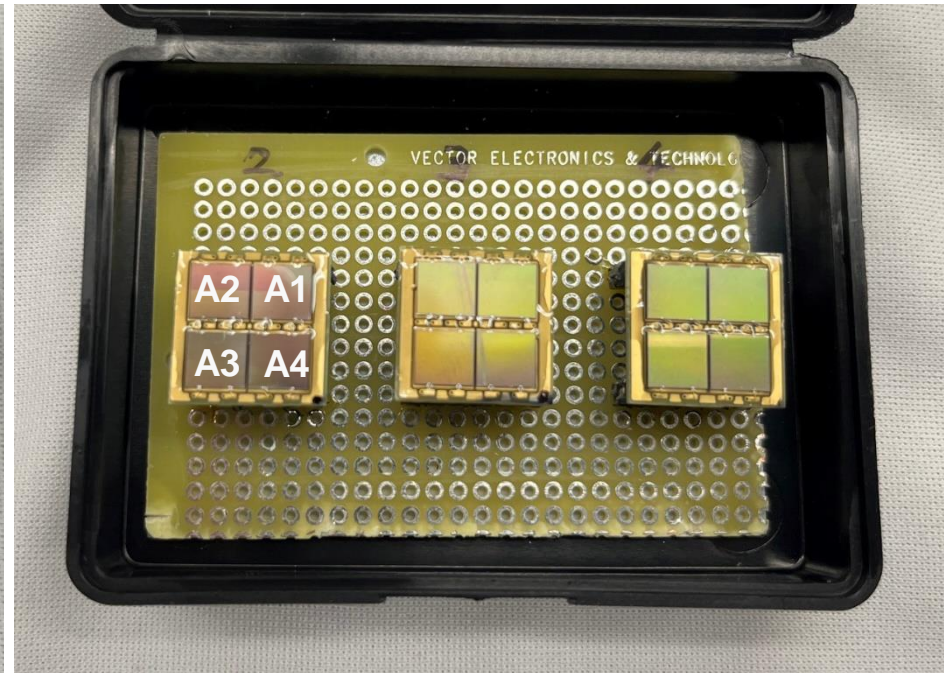


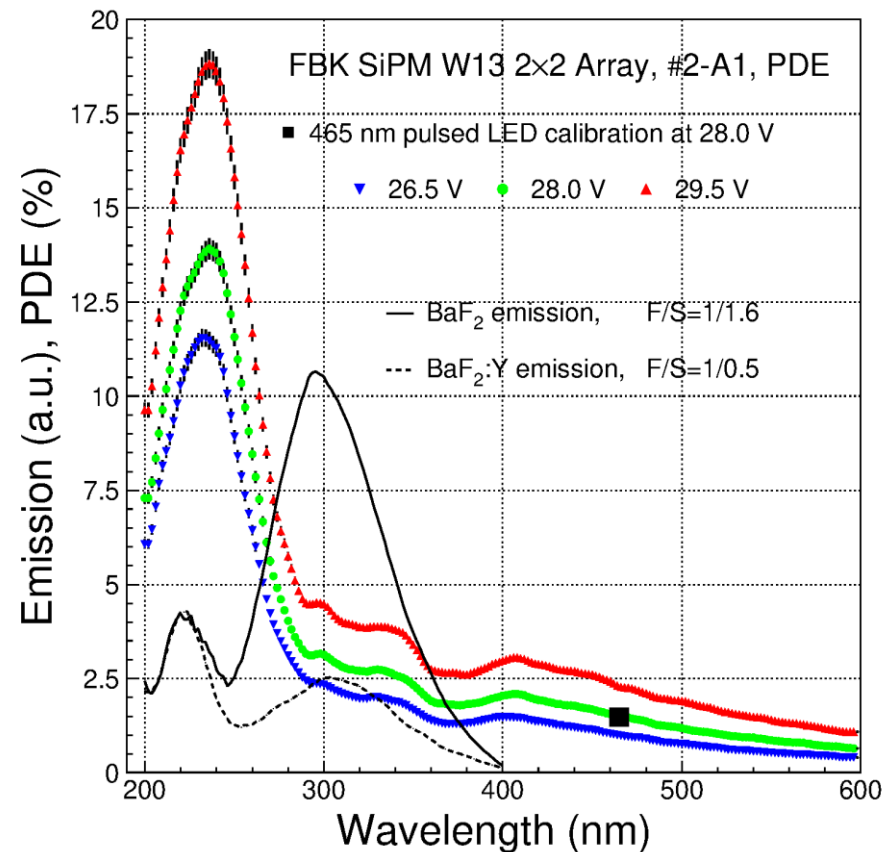
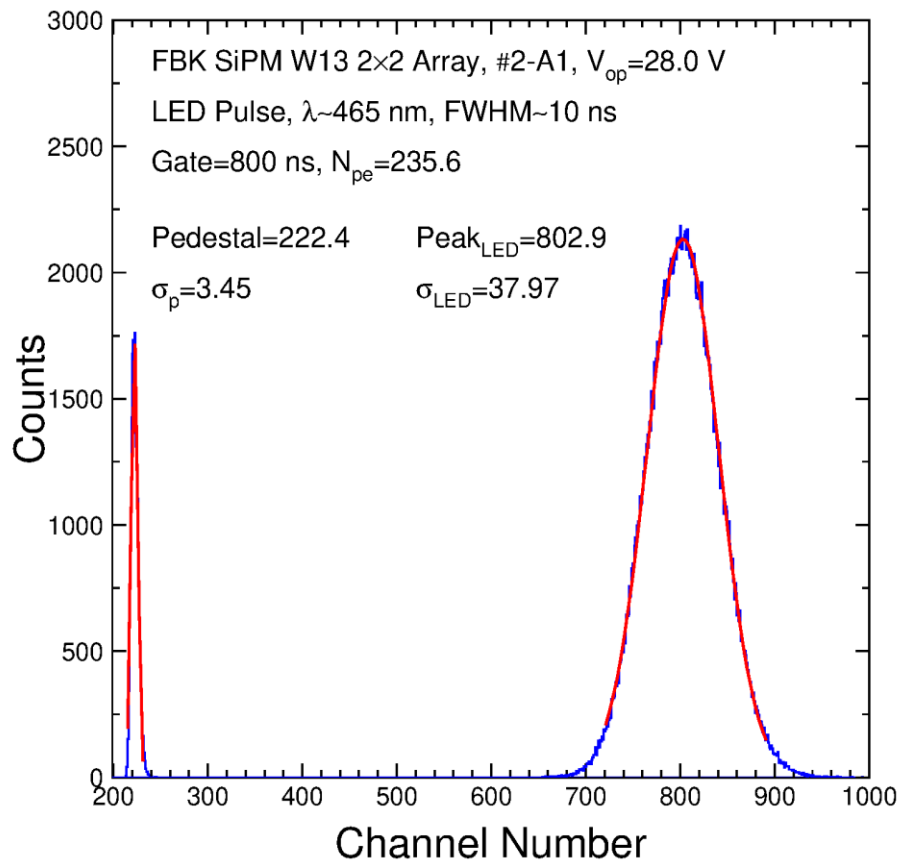
FBK SiPM Caltech-W13 with 2×2 Arrays

Three FBK W13 2×2 arrays (#2, #3 and #4) with 4 SiPMs:
A1, A2, A3 and A4 in each array were received
All 4 SiPMs in array #3 were found dead or having too high dark current
A1 and A3 SiPMs on arrays #2 and #4 were measured



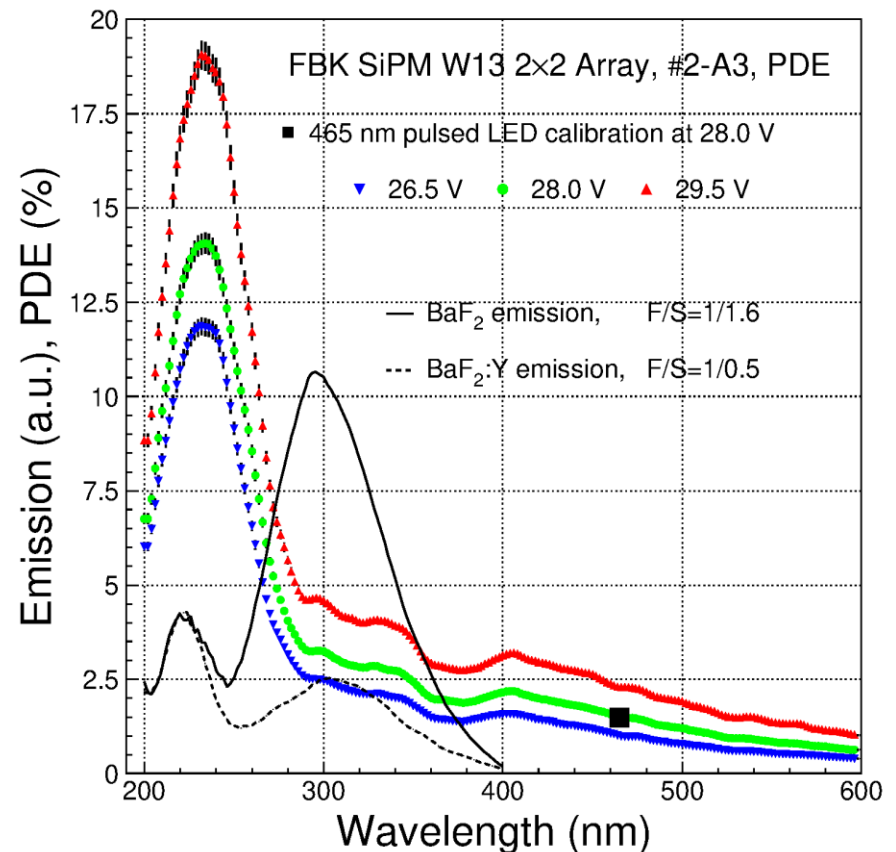
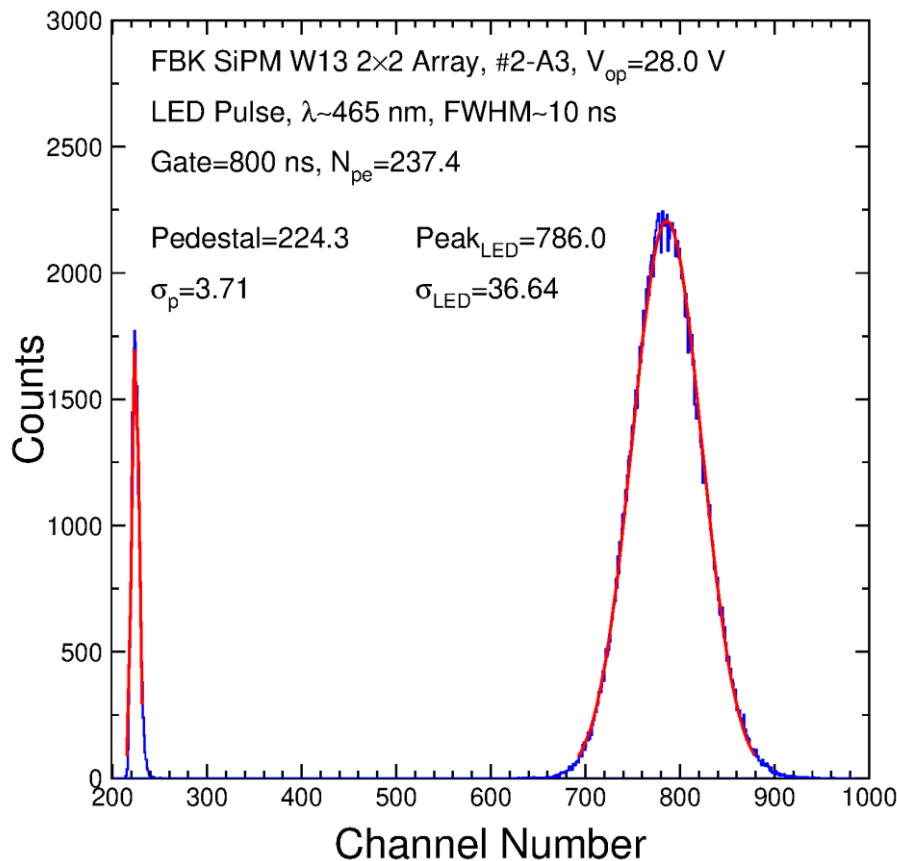
FBK SiPM W13, 2×2 Array, #2-A1

Input photons (465 nm LED pulse on 30 mm² active area): 18480 p.e.# at 28.0 V: 235.6, PDE (465 nm) = 1.48% with an ENF of 1.16 included
PDE(λ) at 200-600 nm measured with V_{op} = 26.5, 28.0 and 29.5 V



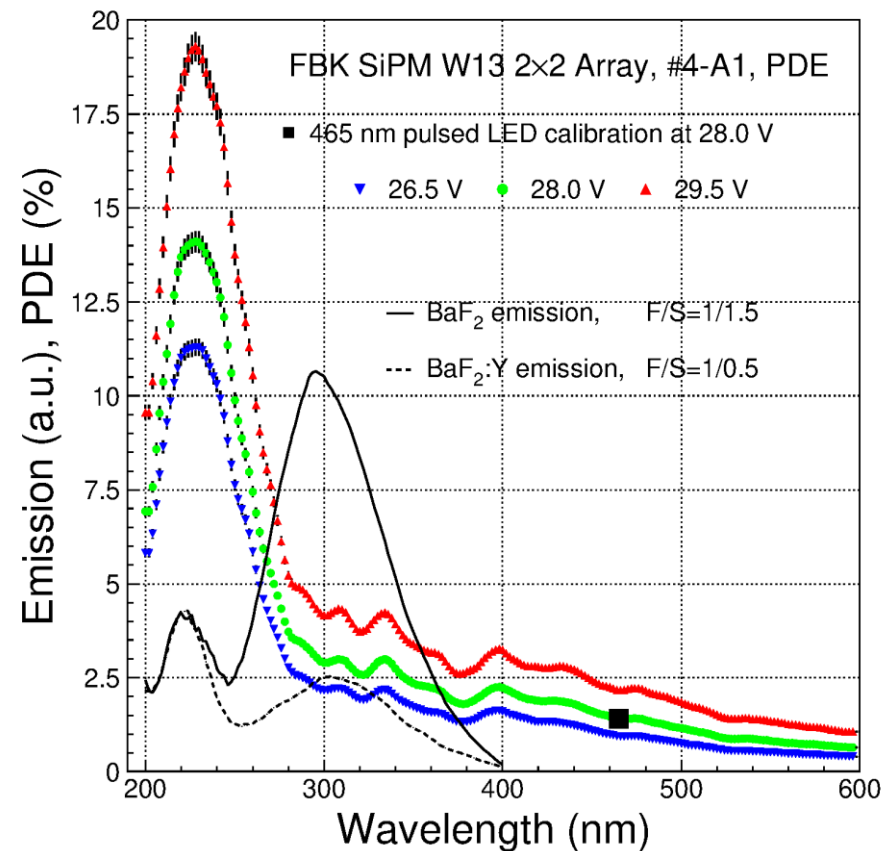
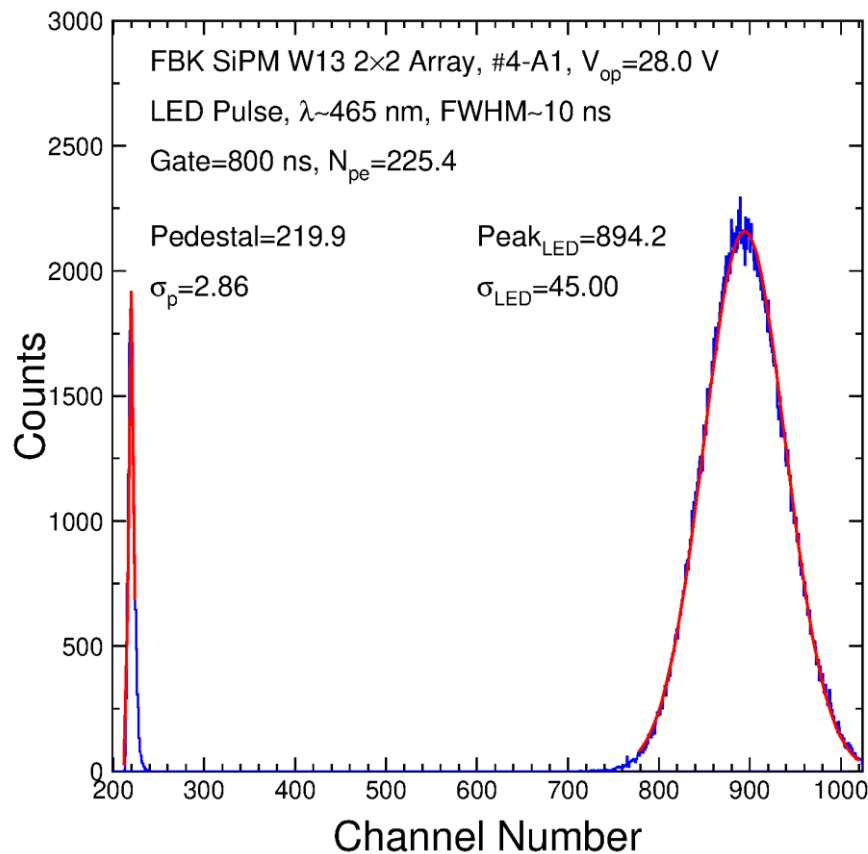
FBK SiPM W13, 2×2 Array, #2-A3

Input photons (465 nm LED pulse on 30 mm² active area): 18480 p.e.# at 28.0 V: 237.4, PDE (465 nm) = 1.49% with an ENF of 1.16 included
PDE(λ) at 200-600 nm measured with V_{op} = 26.5, 28.0 and 29.5 V



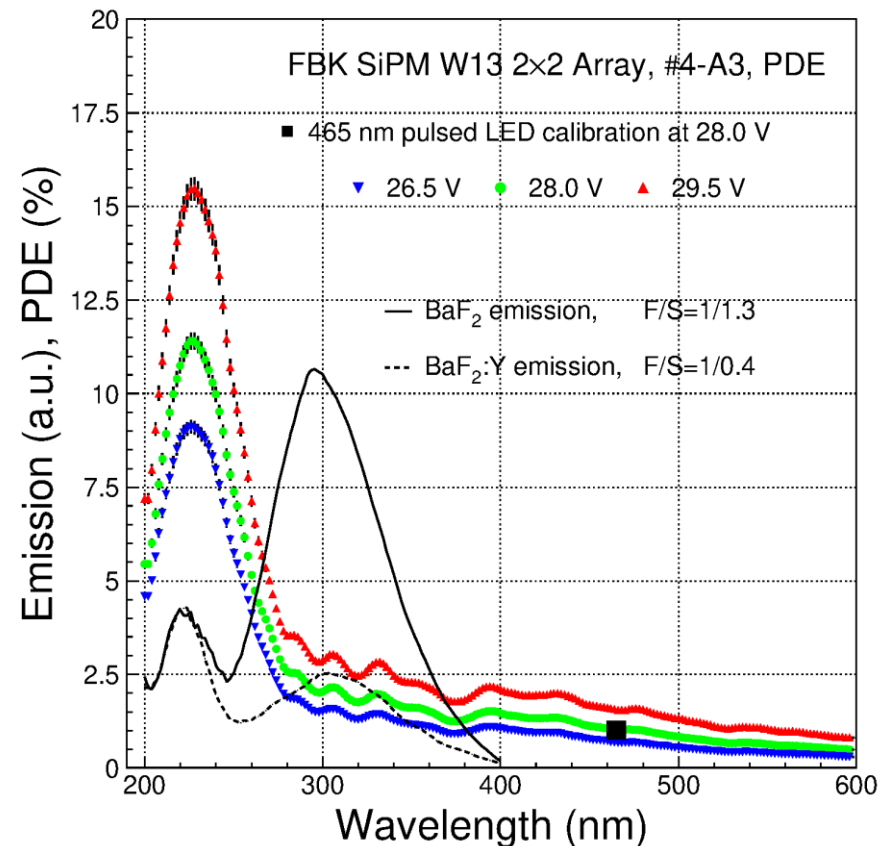
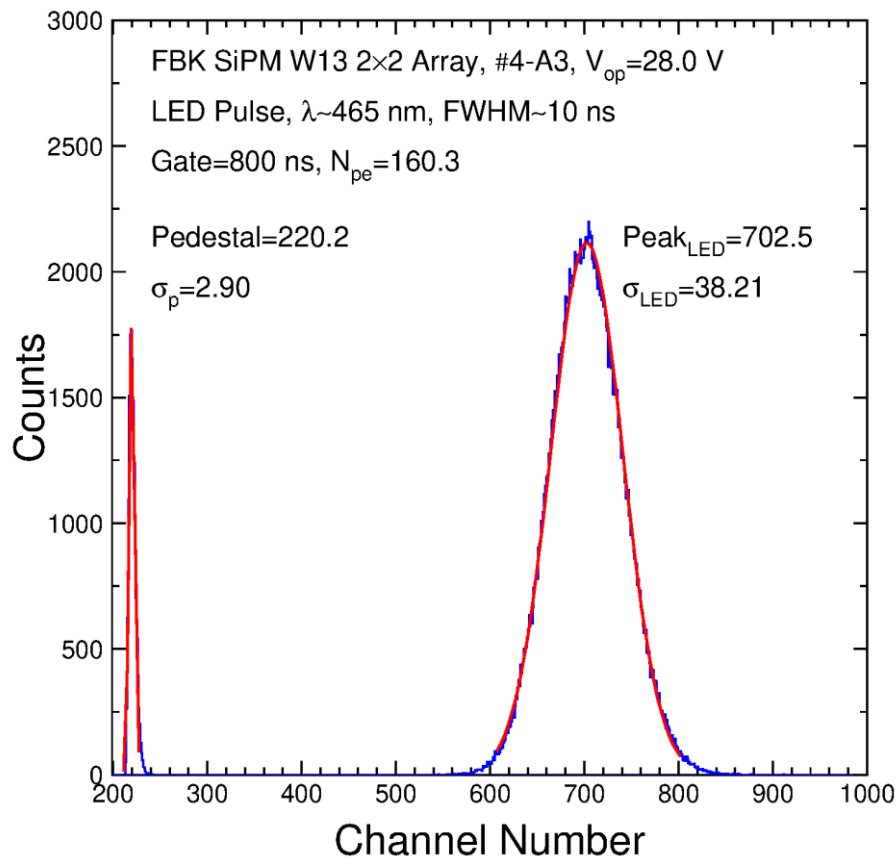
FBK SiPM W13, 2×2 Array, #4-A1

Input photons (465 nm LED pulse on 30 mm² active area): 18480 p.e.# at 28.0 V: 225.4, PDE (465 nm) = 1.41% with an ENF of 1.16 included
PDE(λ) at 200-600 nm measured with V_{op} = 26.5, 28.0 and 29.5 V



FBK SiPM W13, 2×2 Array, #4-A3

Input photons (465 nm LED pulse on 30 mm² active area): 18480
p.e.# at 28.0 V: 160.3, PDE (465 nm) = 1.01% with an ENF of 1.16 included
PDE(λ) at 200-600 nm measured with V_{op} = 26.5, 28.0 and 29.5 V



A Brief Summary

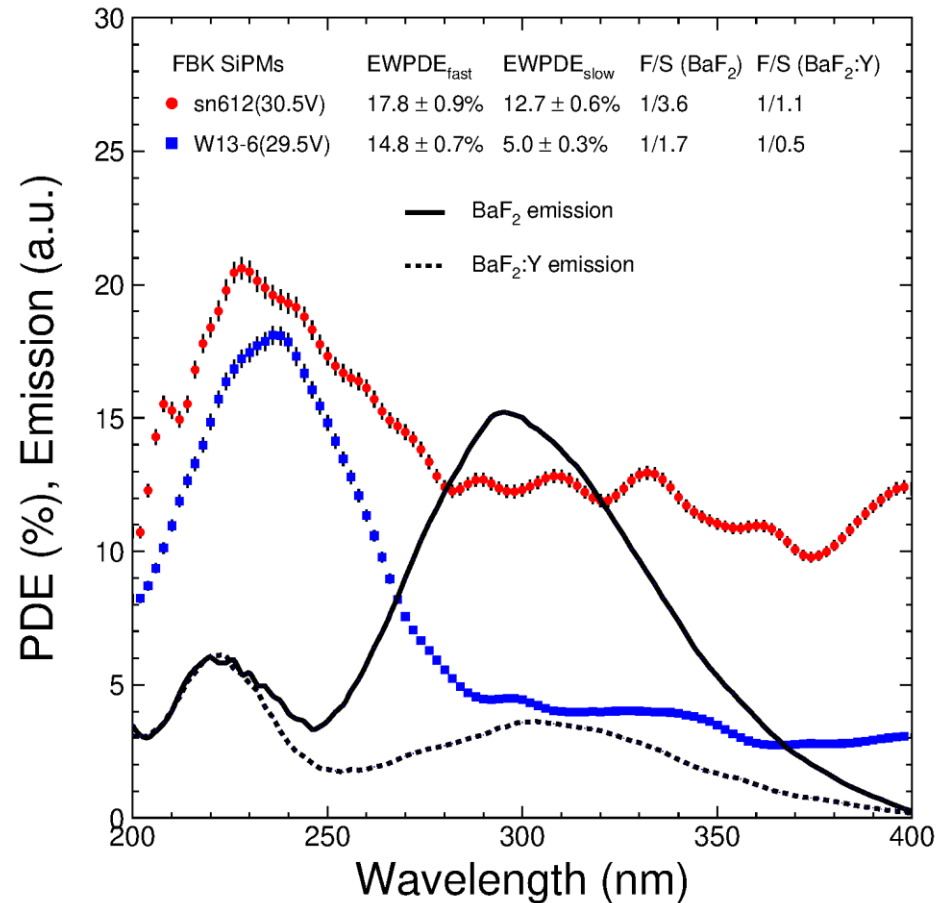
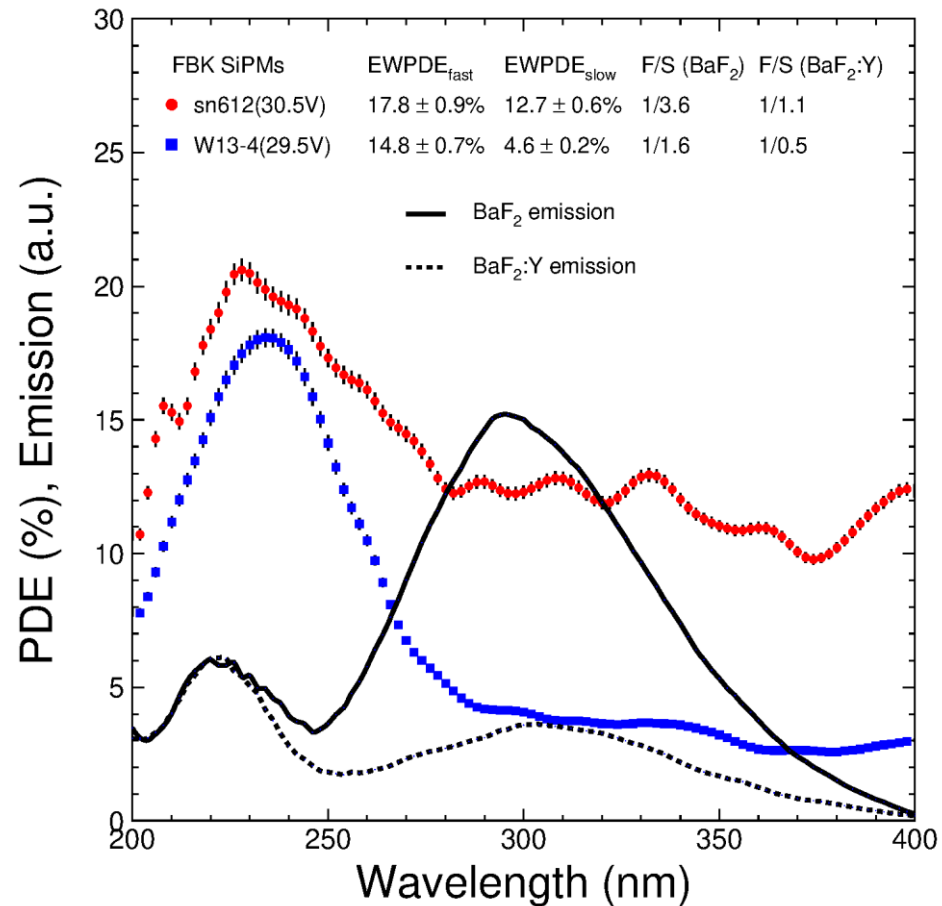
FBK W13 arrays are consistent with W13-4, 5 and 6 tested in Summer
More effective discrimination against BaF_2 slow as compared to sn612

SN	V_{br} (V)	V_{op} (V)	$\text{EWPDE}_{\text{fast}}$ (%)	$\text{EWPDE}_{\text{slow}}$ (%)	F/S (BaF_2)	F/S ($\text{BaF}_2:\text{Y}$)
Sn612 (Ref.)	25.0	30.5	17.8	12.7	1/3.6	1/1.1
W13-4	25.58	29.5	14.8	4.6	1/1.6	1/0.5
W13-5	25.58	29.5	9.9	2.8	1/1.5	1/0.5
W13-6	25.58	29.5	14.8	5.0	1/1.7	1/0.5
W13-2x2-#2-A1	25.58	29.5	16.1	5.1	1/1.6	1/0.5
W13-2x2-#2-A3	25.58	29.5	16.1	5.1	1/1.6	1/0.5
W13-2x2-#4-A1	25.58	29.5	16.6	5.0	1/1.5	1/0.5
W13-2x2-#4-A3	25.58	29.5	13.1	3.4	1/1.3	1/0.4

A pulsed UV LED at 250 nm would improve the calibration precision, e.g.
Edinburgh Instruments [EPLD250](#) (250nm) or PicoQuant [PLS255](#) (255 nm)

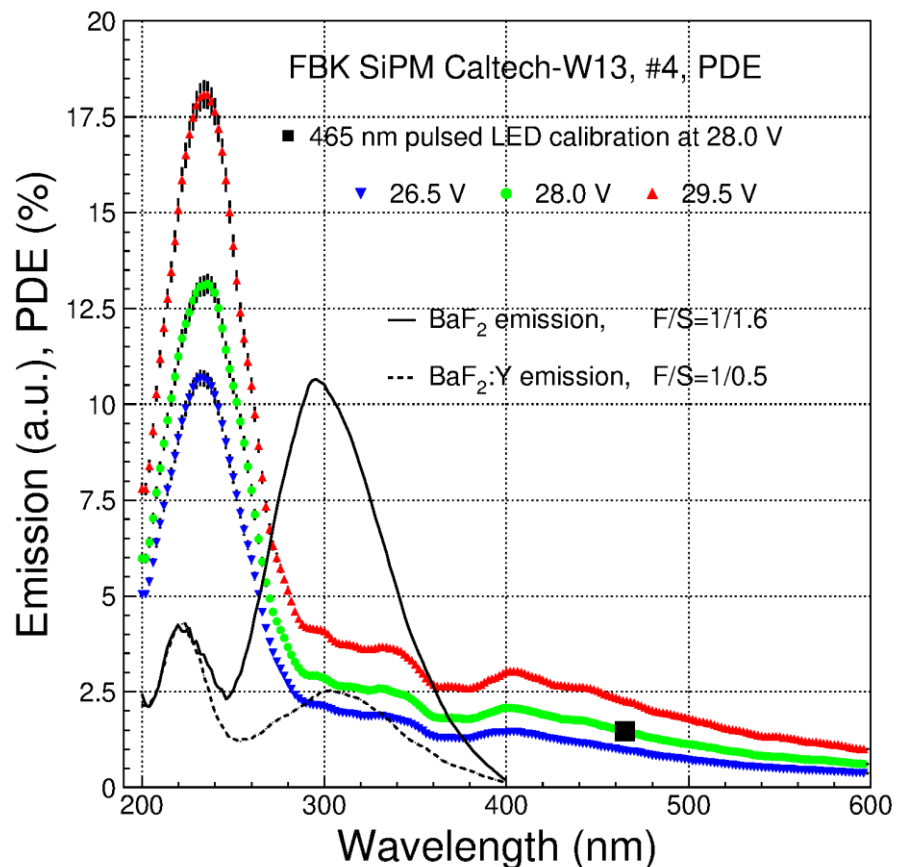
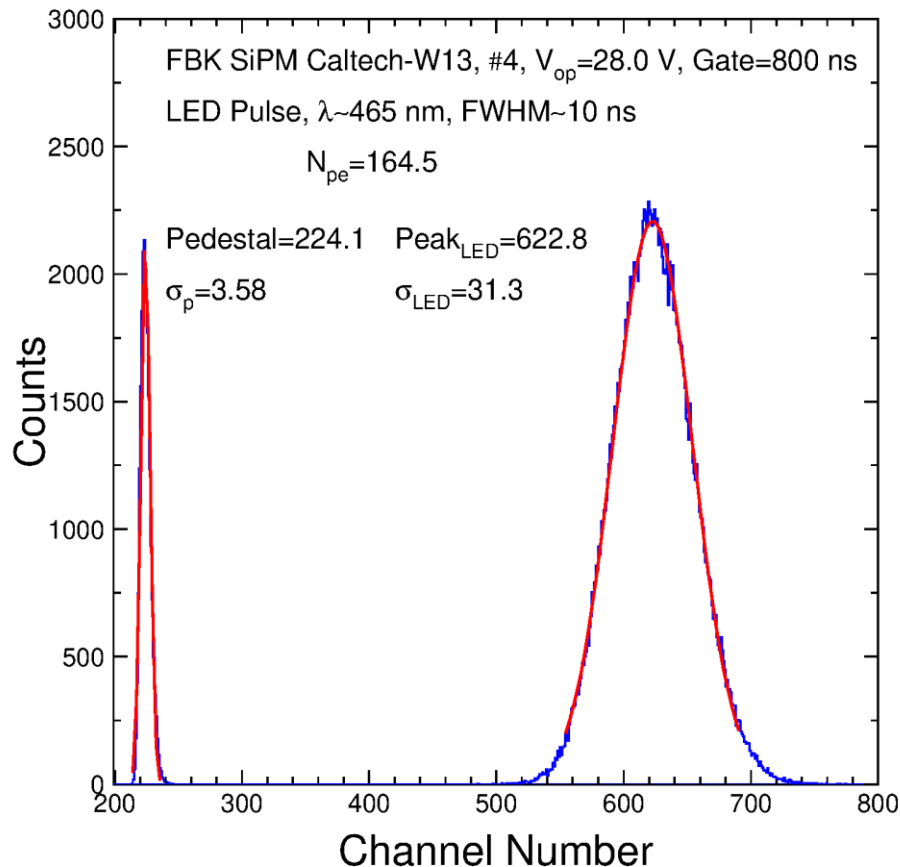
Comparison with the Previous Batch

Performance of arrays similar to W13-4 and 6 measured in summer
Fast/Slow ratio of 1/1.6 and 1/0.5 for BaF₂ and BaF₂:Y, respectively
More effective discrimination against BaF₂ slow as compared to sn612



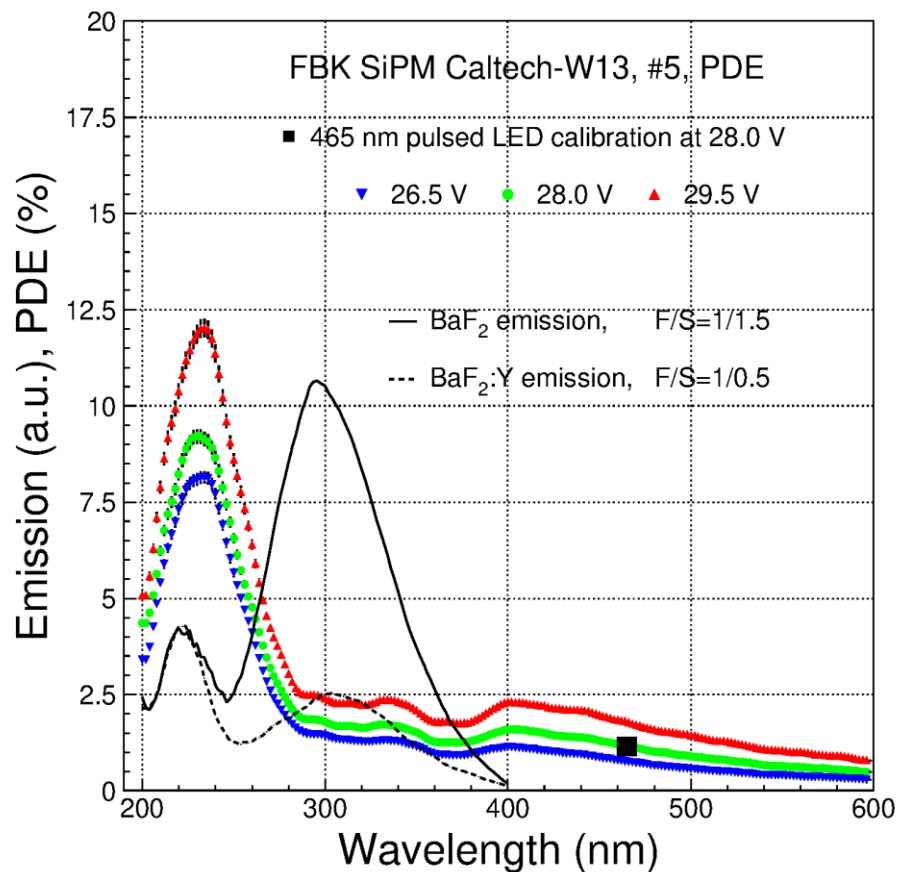
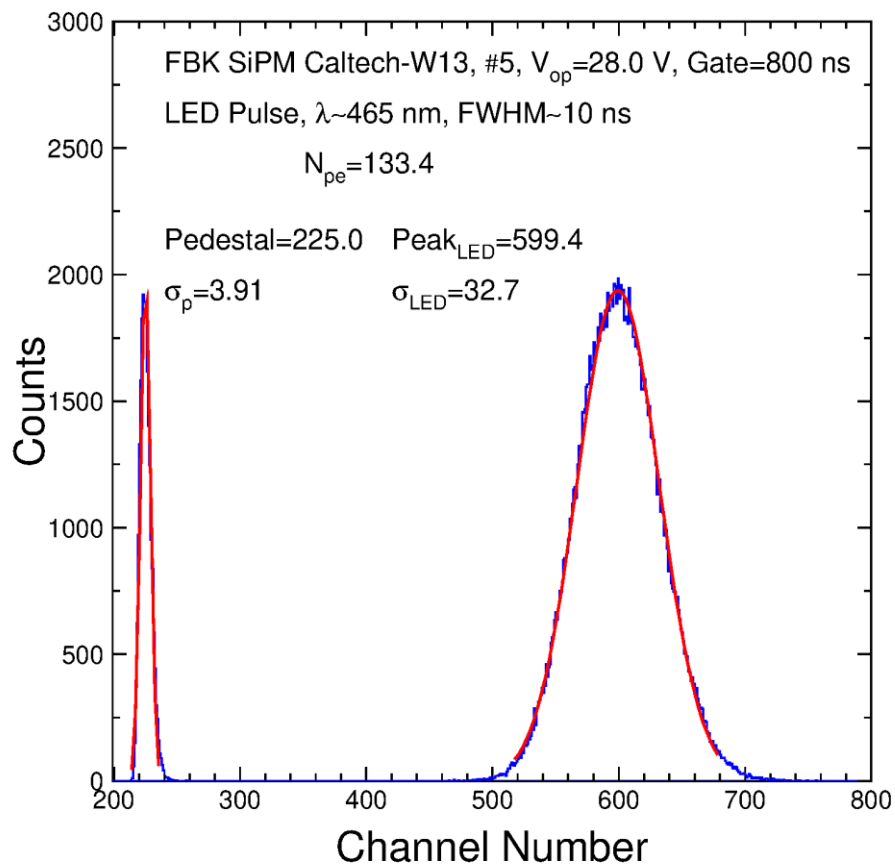
FBK SiPM: Caltech-W13, #4

Input photons (465 nm LED pulse on 30 mm² active area): 13230 p.e.# at 28.0 V: 164.5, PDE (465nm) = 1.46% with ENF of 1.17 included
PDE(λ) at 200-600 nm measured with V_{op} = 26.5, 28.0 and 29.5 V



FBK SiPM: Caltech-W13, #5

Input photons (465 nm LED pulse on 30 mm² active area): 13230
p.e.# at 28.0 V: 133.4, PDE (465nm) = 1.15% with ENF of 1.14 included
PDE(λ) at 200-600 nm measured with V_{op} = 26.5, 28.0 and 29.5 V .



FBK SiPM: Caltech-W13, #6

Input photons (465 nm LED pulse on 30 mm² active area): 13230 p.e.# at 28.0 V: 173.3, PDE (465nm) =1.51% with ENF of 1.15 included
PDE(λ) at 200-600 nm measured with V_{op} = 26.5, 28.0 and 29.5 V

