

The script that uses to compute the cuts

<https://gitlab.com/hawc-observatory/sandboxes/kellymalone/gamma-hadron-optimization>

A new class was created to compute the LIC & PINC cuts with the following Quality cut:

- `rec.angleFitStatus==0`
- `rec.coreFitStatus==0`
- `rec.nChTot>=800`
- `rec.nChAvail>0.9*rec.nChTot`

The files is at UMD cluster:

- `/data/disk01/home/tcapistran/Doctorado/TheLastAnalysis/NewSC/FHitNNEnergyV2BinningLogicWoSC.cxx`
- `/data/disk01/home/tcapistran/Doctorado/TheLastAnalysis/NewSC/FHitNNEnergyV2BinningLogicWoSC.h`

File to use:

- MC Signal:

- Original `/data/archive/hawcroot/sim/reco/bobs-ednas-thresh0p2/reco_files/gamma.xcd`
- Add the weights: `/data/scratch/userspace/tcapistran/GHSEP/Sweet/2.63_3.45e-11_1000000_20_1.0/succeeded/2.63_3.45e-11_1000000_20_1.0_combined_rec.xcd`

- Real background:

- `/data/scratch/userspace/kmalone/scrappy-platypus-dev/code/files/run005214.dec20.xcd`

fbin	ebin	Signal			Background		
		Evts after the G/H cuts	Evts using Quality cut	Efficiency	Evts after the G/H cuts	Evts using Quality cut	Efficiency
0	0	321571	424489	0.7575	39885	194449	0.2051
1	0	126800	174422	0.7270	9573	66649	0.1436
2	0	10919	14062	0.7765	715	7233	0.0989
3	0	49	73	0.6712	2	212	0.0094
0	1	415067	656692	0.6321	44096	355937	0.1239
1	1	395499	595306	0.6644	23371	223156	0.1047
2	1	158549	247999	0.6393	5267	73646	0.0715
3	1	10534	18064	0.5831	241	7059	0.0341
0	2	429281	803832	0.5340	36681	431770	0.0850
1	2	314533	587348	0.5355	16097	284634	0.0566
2	2	337785	558654	0.6046	9554	174229	0.0548
3	2	150276	269590	0.5574	2229	68408	0.0326
4	2	11882	19816	0.5996	105	5706	0.0184
5	2	81	147	0.5510	1	109	0.0092
0	3	386334	837889	0.4611	25387	494831	0.0513
1	3	225441	590049	0.3821	8887	348808	0.0255
2	3	190238	406638	0.4678	4252	182517	0.0233
3	3	227251	447941	0.5073	2653	134615	0.0197
4	3	102916	212464	0.4844	644	55500	0.0116
5	3	9681	18855	0.5134	39	4938	0.0079

fbin	ebin	Signal			Background		
		Evts after the G/H cuts	Evts using Quality cut	Efficiency	Evts after the G/H cuts	Evts using Quality cut	Efficiency
0	4	237412	525192	0.4520	9133	311313	0.0293
1	4	173133	485561	0.3566	5000	337929	0.0148
2	4	113581	335770	0.3383	2033	218459	0.0093
3	4	120480	285322	0.4223	1154	119453	0.0097
4	4	141452	298575	0.4738	713	105634	0.0067
5	4	84926	156619	0.5422	259	48357	0.0054
6	4	10195	18640	0.5469	13	4755	0.0027
7	4	237	360	0.6583	1	90	0.0111
0	5	128246	252878	0.5071	3502	151316	0.0231
1	5	130377	338520	0.3851	1888	224095	0.0084
2	5	83493	265412	0.3146	941	217856	0.0043
3	5	64991	206505	0.3147	406	132972	0.0031
4	5	74998	189974	0.3948	308	81856	0.0038
5	5	88602	196696	0.4505	189	84585	0.0022
6	5	60293	116645	0.5169	79	41088	0.0019
7	5	12821	23853	0.5375	10	5547	0.0018
0	6	56222	97188	0.5785	1323	63947	0.0207
1	6	96991	200859	0.4829	1025	121588	0.0084
2	6	74757	206486	0.3620	453	163518	0.0028
3	6	48957	152532	0.3210	238	146162	0.0016 4

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0	6	56222	97188	0.5785	1323	63947	0.0207
1	6	96991	200859	0.4829	1025	121588	0.0084
2	6	74757	206486	0.3620	453	163518	0.0028
3	6	48957	152532	0.3210	238	146162	0.0016
4	6	39962	123412	0.3238	113	74749	0.0015
5	6	38507	117532	0.3276	69	57817	0.0012
6	6	43843	111752	0.3923	34	57785	0.0006
7	6	42494	77336	0.5495	22	30919	0.0007
8	6	14190	24705	0.5744	4	5874	0.0007
9	6	1954	3421	0.5712	1	276	0.0036
0	7	17301	30215	0.5726	376	25365	0.0148
1	7	43882	89951	0.4878	300	60039	0.0050
2	7	70829	157956	0.4484	223	103769	0.0021
3	7	48041	124094	0.3871	122	128893	0.0009
4	7	31874	82599	0.3859	57	83081	0.0007
5	7	22753	72792	0.3126	22	45862	0.0005
6	7	21331	67253	0.3172	7	38899	0.0002
7	7	26065	64264	0.4056	8	39045	0.0002
8	7	23226	51717	0.4491	6	24271	0.0002
9	7	16180	32773	0.4937	3	7136	0.0004

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		Evts after the G/H cuts	Evts using Quality cut	Efficiency	Evts after the G/H cuts	Evts using Quality cut	Efficiency
0	8	2337	3877	0.6028	175	8229	0.0213
1	8	11205	20406	0.5491	142	25190	0.0056
2	8	34074	68959	0.4941	100	54754	0.0018
3	8	61033	120011	0.5086	98	94215	0.0010
4	8	32607	74299	0.4389	17	91316	0.0002
5	8	20225	48387	0.4180	11	49869	0.0002
6	8	15490	40580	0.3817	5	29603	0.0002
7	8	11571	37711	0.3068	1	26255	0.0000
8	8	12521	36910	0.3392	3	26091	0.0001
9	8	23031	63283	0.3639	1	27943	0.0000
0	9	324	648	0.5000	23	2677	0.0086
1	9	1390	2375	0.5853	46	8382	0.0055
2	9	5343	11462	0.4661	26	22399	0.0012
3	9	18240	38412	0.4749	21	46909	0.0004
4	9	34902	65503	0.5328	16	66765	0.0002
5	9	27704	49188	0.5632	12	60019	0.0002
6	9	13004	30253	0.4298	2	32491	0.0001
8	9	6516	18524	0.3518	1	15492	0.0001
9	9	21128	56573	0.3735	2	37103	0.0001
0	10	33	112	0.2946	5	956	0.0052 6

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		Evts after the G/H cuts	Evts using Quality cut	Efficiency	Evts after the G/H cuts	Evts using Quality cut	Efficiency
0	10	33	112	0.2946	5	956	0.0052
1	10	135	346	0.3902	9	3111	0.0029
2	10	891	1661	0.5364	9	8302	0.0011
3	10	4297	8941	0.4806	6	19808	0.0003
4	10	10707	21756	0.4921	5	31754	0.0002
5	10	16212	30666	0.5287	3	39964	0.0001
6	10	15074	27266	0.5528	2	35312	0.0001
7	10	7999	17908	0.4467	1	21631	0.0000
9	10	17284	39442	0.4382	1	32192	0.0000
0	11	12	14	0.8571	26	337	0.0772
1	11	33	62	0.5323	13	1337	0.0097
2	11	127	172	0.7384	35	3487	0.0100
3	11	522	902	0.5787	2	7980	0.0003
4	11	2936	4942	0.5941	1	13636	0.0001
5	11	5543	11096	0.4995	1	18971	0.0001