

Update on LIV

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Fixed Broad Pulse Issue

- For no broad pulse, one of the high-E bins had an overly wide PSF
 - Tripped exception in HAL to skip it
- Caused limits to be worse, since high energy events were excluded
- But we aren't using the PSF, so could just disable this flag
- With this bin included, things now make sense

Limits and Systematics

95.00%

Name	Nominal	0 BP	Thresh 0.15		Thresh 0.25 Qunc 0.0	Qunc 0.6	:
Crab	152		157	149	147	150	144
J1825-134	253		275	247	250	256	238
J1839-057	79		79	77	78	79	76
J1844-032	77		78	73	75	76	72
J1908+063	213		222	209	210	213	203
J2019+367	121		123	120	121	121	120
J2031+415	144		148	144	146	147	143

"3 sigma"

Name	Nominal	0 BP	Thresh 0.15		Thresh 0.25 Qunc 0.0	Qunc 0.6	:
Crab	96		109	96	95	98	89
J1825-134	168		187	163	169	168	178
J1839-057	66		67	66	67	67	65
J1844-032	63		65	62	64	65	61
J1908+063	156		166	155	157	158	159
J2019+367	86		88	85	87	87	83
J2031+415	85		92	82	88	94	100

Additional Checks

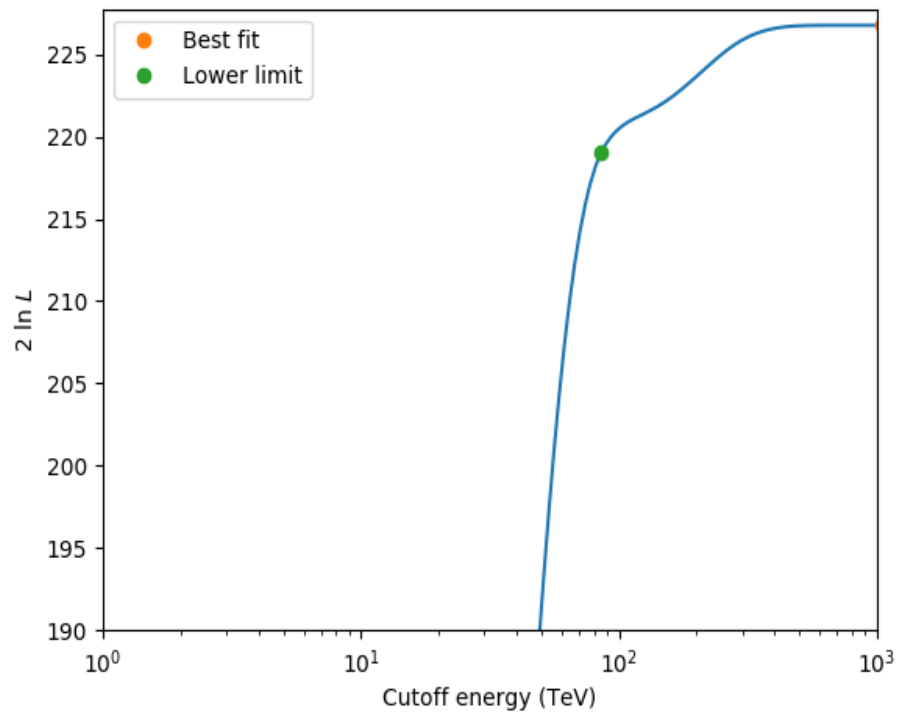
- Tried different spectra
 - Log parabola (nominal for crab) and cutoff power law (nominal for everything else)
- Also tried fitting at high-energy catalog location
 - Best-fit location of source if only >56 TeV events are considered
 - Seems to make limits worse in all cases (especially for 1825 at 3 sigma, need to double check this one)

Name	Nominal	Swapped Spectrum	Shifted	Position shift (deg)	
Crab	96		86	83	0.02
J1825-134	168		186	88	0.07
J1839-057	66		67	68	0.3
J1844-032	63		62	60	0.44
J1908+063	156		162	143	0.16
J2019+367	86		83	84	0.02
J2031+415	85		99	94	0.34

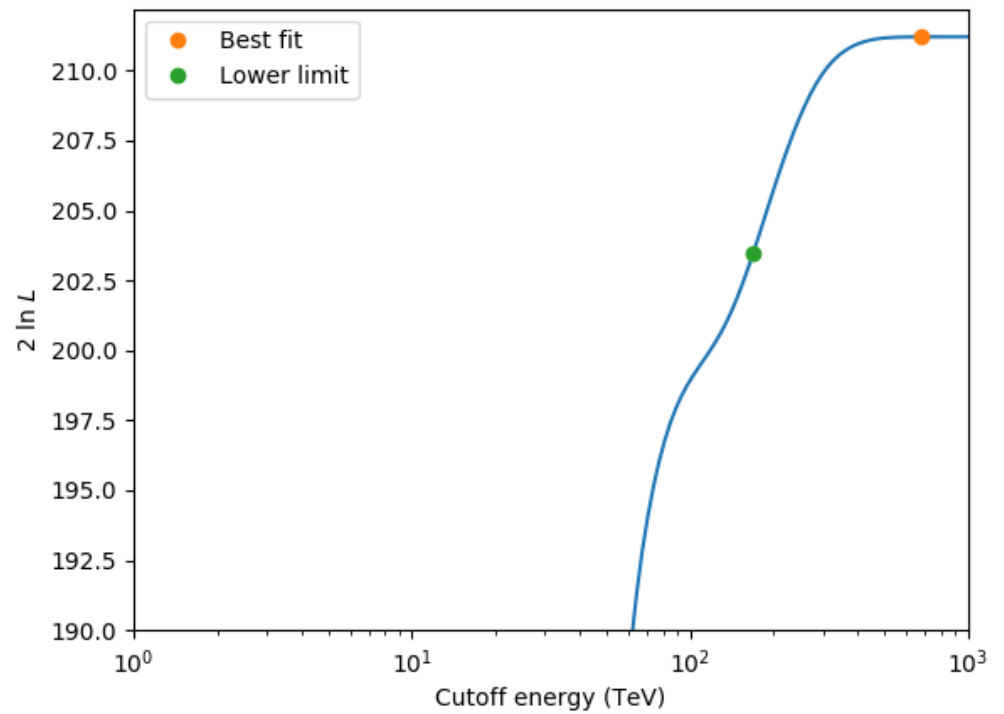
95.00%

Name	Nominal	Swapped Spectrum	Shifted to High-I	Position shift (deg)	
Crab	152		128	128	0.02
J1825-134	253		265	213	0.07
J1839-057	79		78	80	0.3
J1844-032	77		73	71	0.44
J1908+063	213		218	177	0.16
J2019+367	121		115	121	0.02
J2031+415	144		145	130	0.34

J1825 Likelihood Curves



Shifted



Unshifted

Combined Limits

- Used summed likelihood profiles to get combined lower limits using all sources
- Limits are equal to or slightly worse than the best individual limit in each case
 - Due to some sources having slight preference for non-infinite cutoff → make likelihood curve less steep when combined

Combined Limits	3 Sigma
Nominal	168
0 BP	177
Thresh 0.15	165
Thresh 0.25	167
Qunc 0.0	166
Qunc 0.6	162