

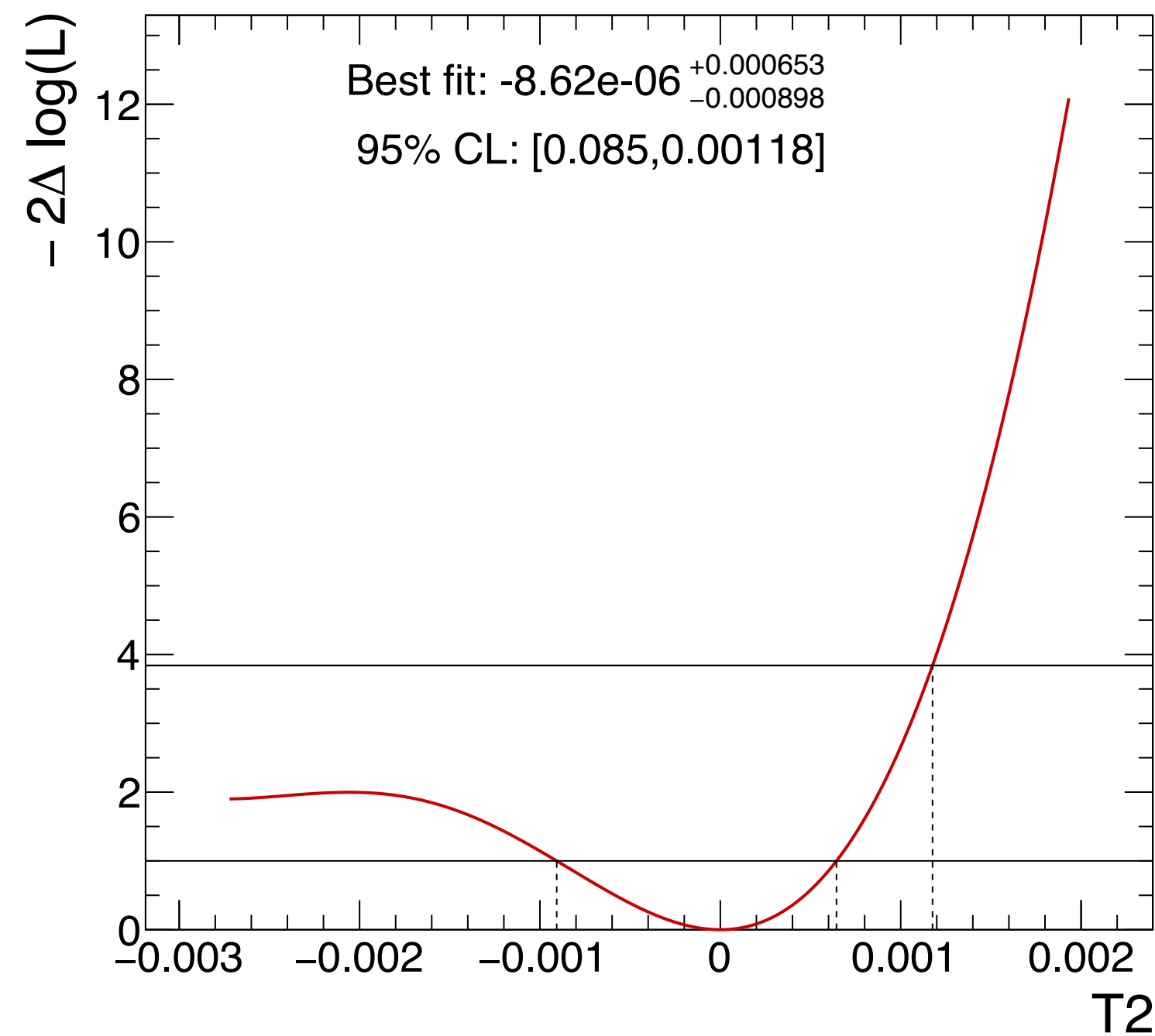
# **Eft-fun Troubleshooting**

# All Limits

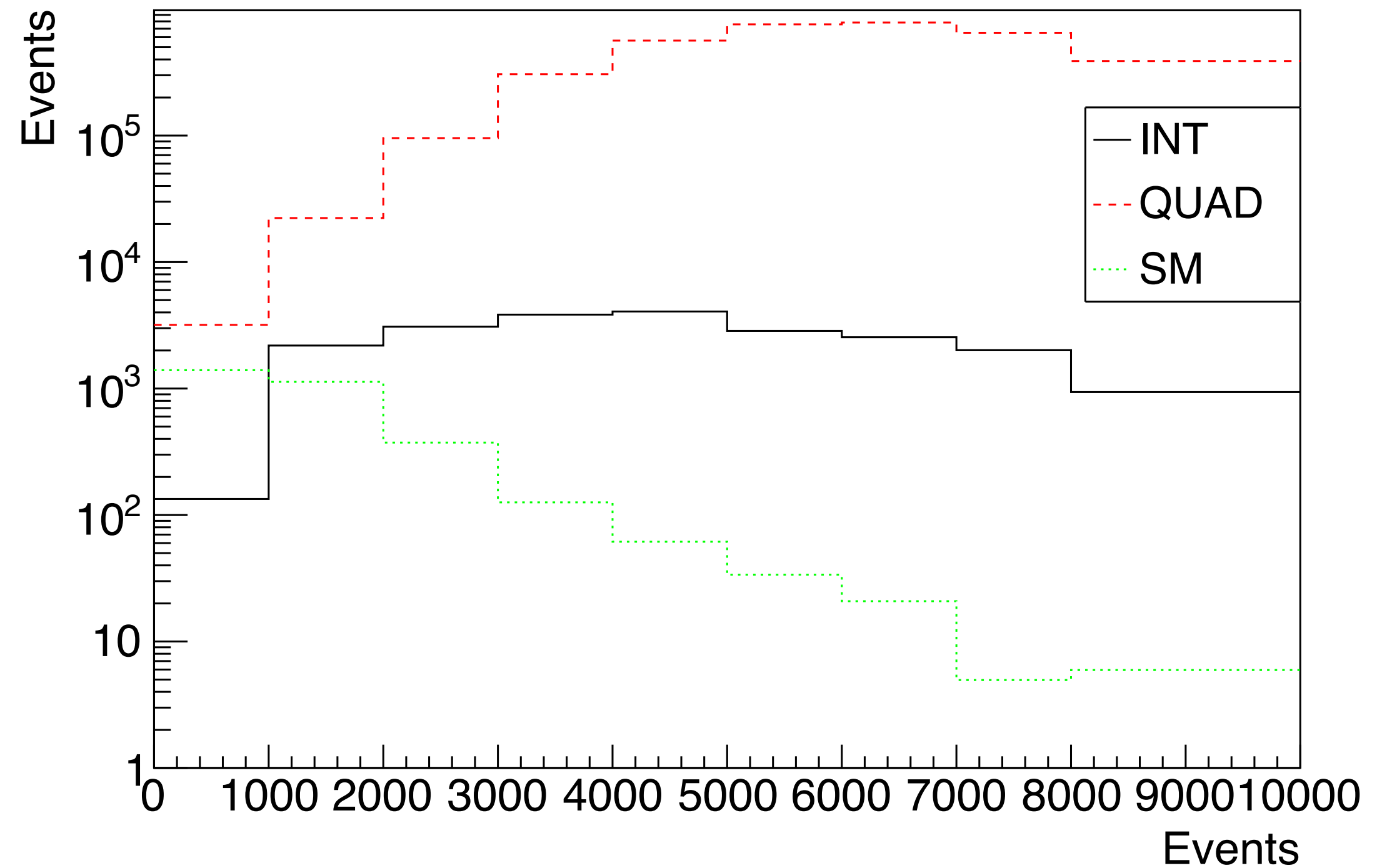
6 TeV	Lower	Upper	10 TeV	Lower	Upper	30 TeV	Lower	Upper
T0	-0.0065212	0.00262228	T0	-0.0011572	0.00056034	T0	-3.12E-05	1.79E-05
T1	-0.0359599	0.023531	T1	-0.001984	0.00088265	T1	-4.85E-05	3.08E-05
T2	-0.051845	0.02954173	T2	<b>0.08531317</b>	<b>0.00117643</b>	T2	-8.97E-05	4.18E-05
T6	-0.0051563	0.00400069	T6	-0.0009018	0.00074049	T6	-2.61E-05	2.32E-05
T7	-0.0066144	0.00418164	T7	-0.0011483	0.00085549	T7	-3.30E-05	2.72E-05

	68%	Lower	Upper
10 TeV T2		-0.000907	0.00064398

Log-likelihood Plot from eft-fun for T2 at 10TeV



Dijet Mass

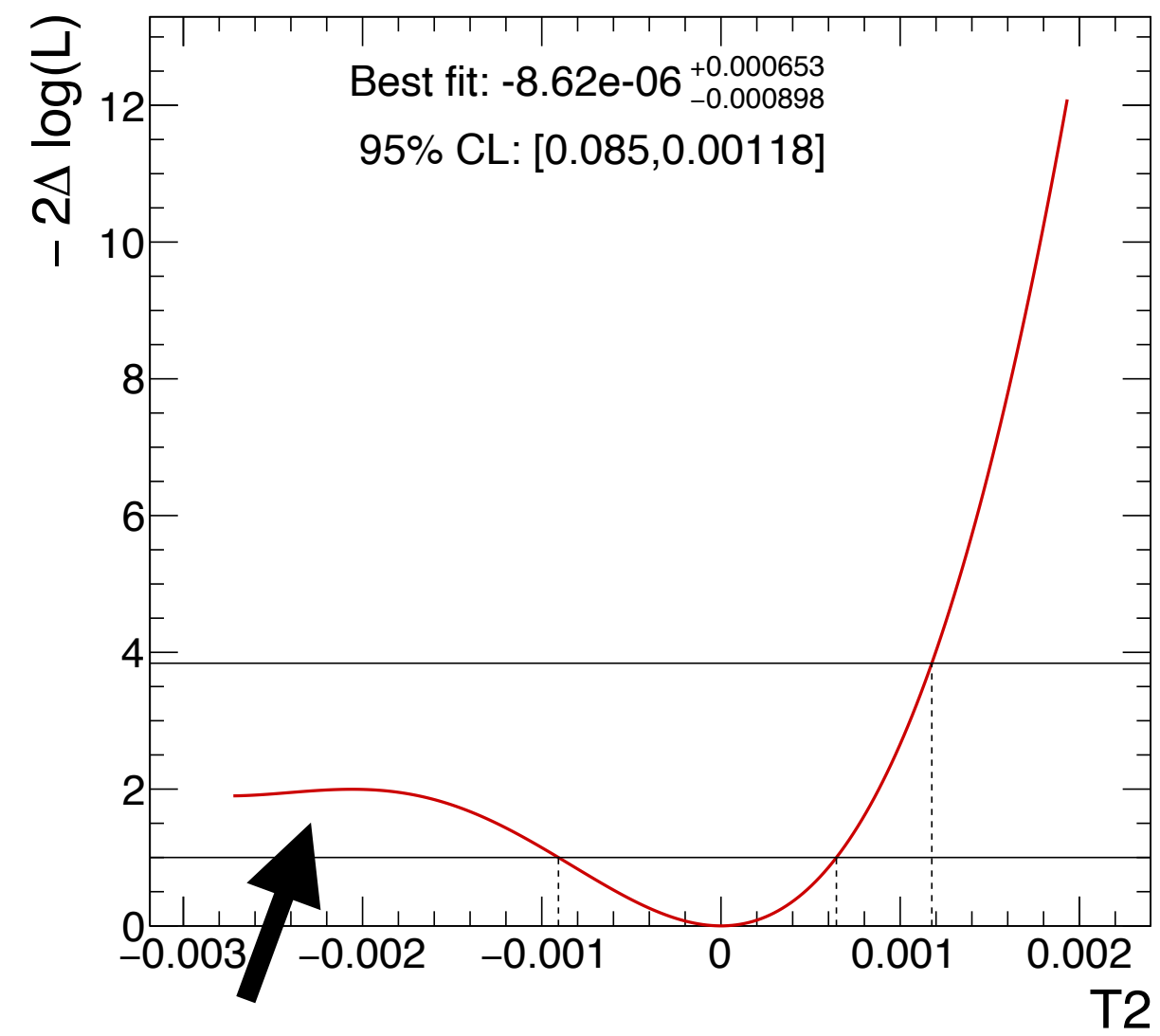


Changed the range setting in the config, original range is [-2, 2]

Half binning: Every other bin was merged with its neighbor

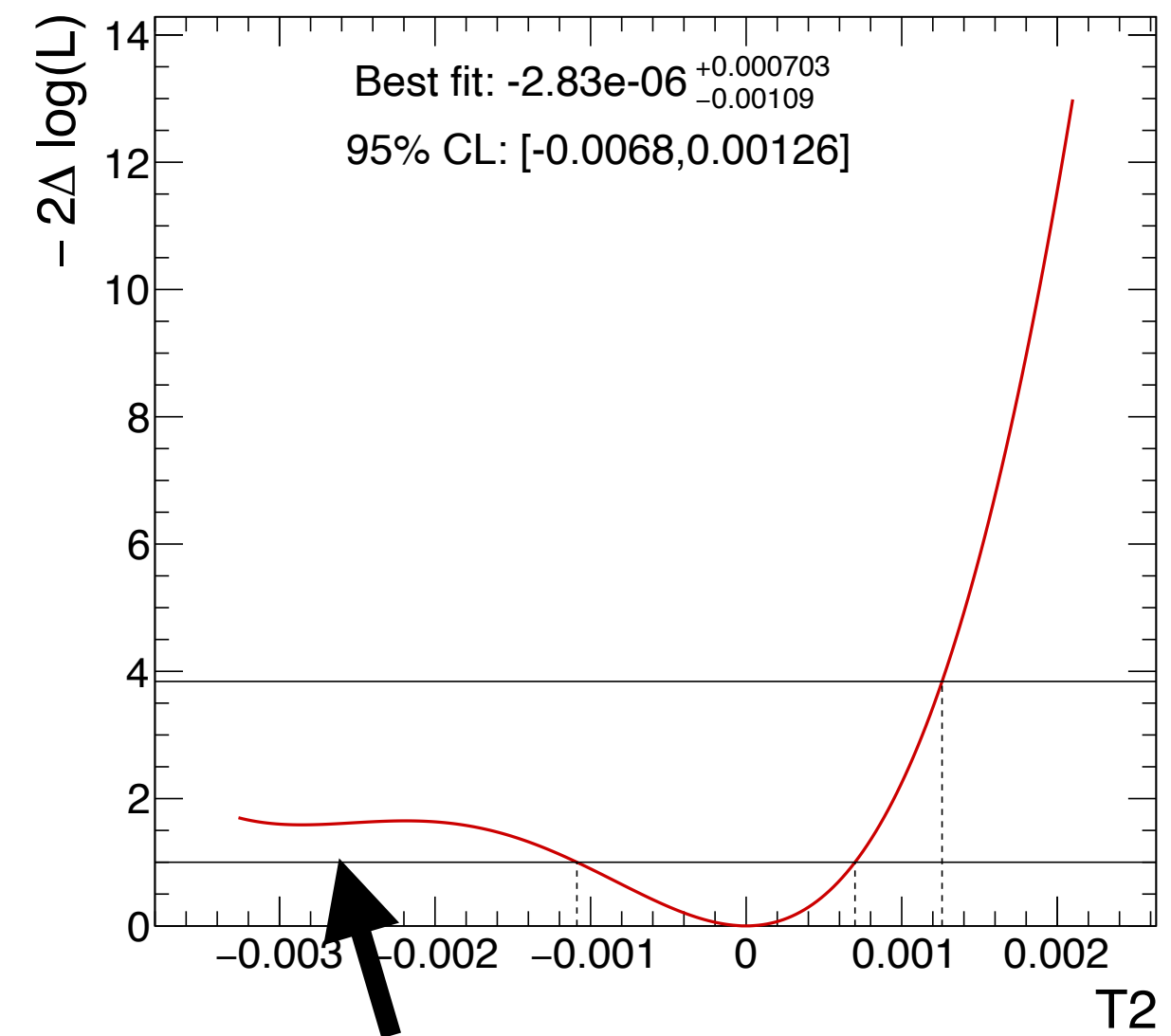
Robustness: Default 1, 1 or 2 recommended, 3 can be used for complicated/failing fits

Range	Lower	Upper
-1000 1000	0.08531317	0.00117643
-0.005 0.005	0.08531317	0.00117643
-0.05 0.05	0.08531317	0.00117643
-0.05 0	-0.003906	0
0 0.05	No limit	No limit
Half Binning range -2 2	-0.0067695	0.00125936
Half Binning range -0.05 0.05	-0.0067695	0.00125936
Robust = 2 -0.05 0.05	0.08531317	0.00117643
Robust = 3 -0.05 0.05	0.08531317	0.00117643

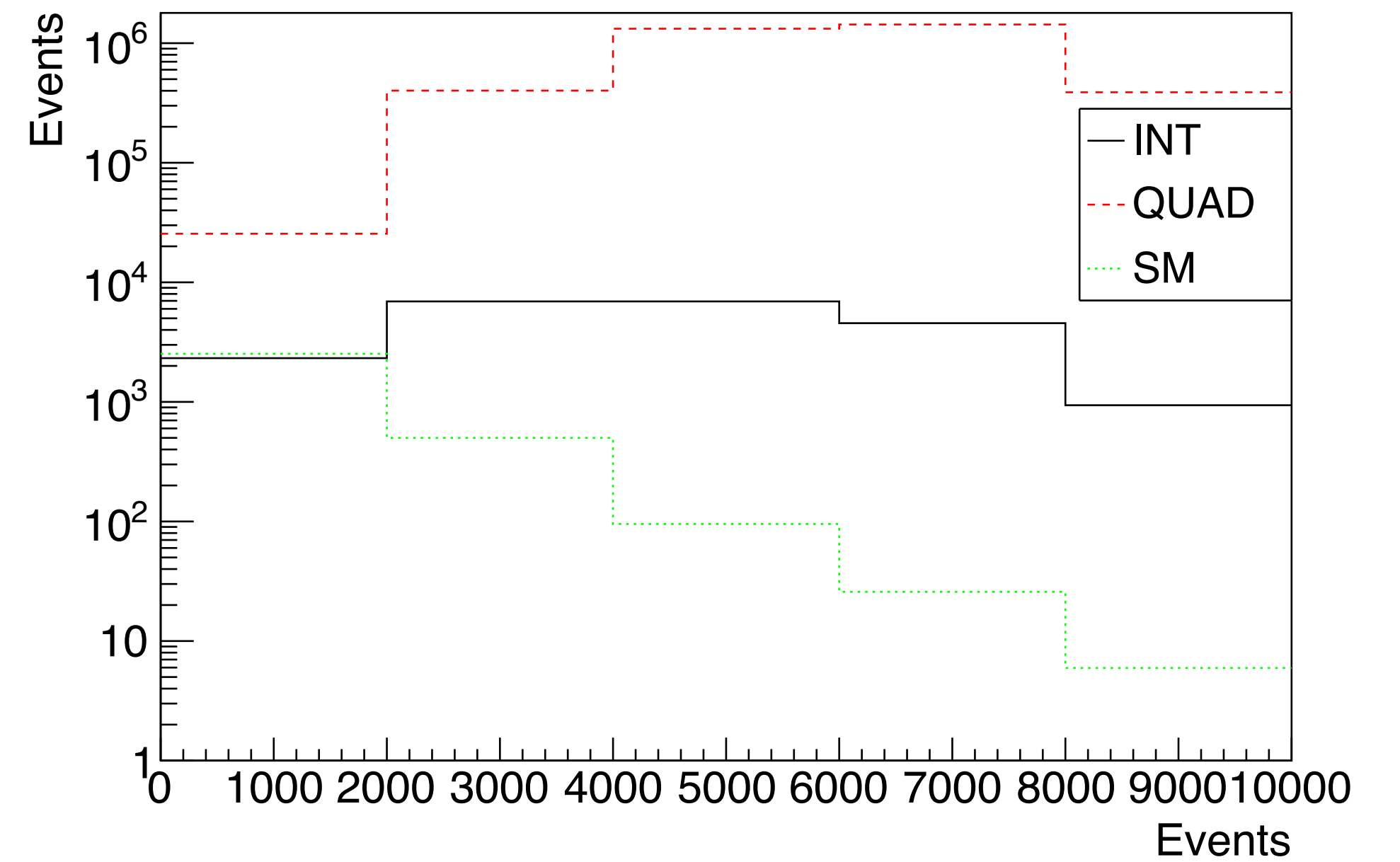
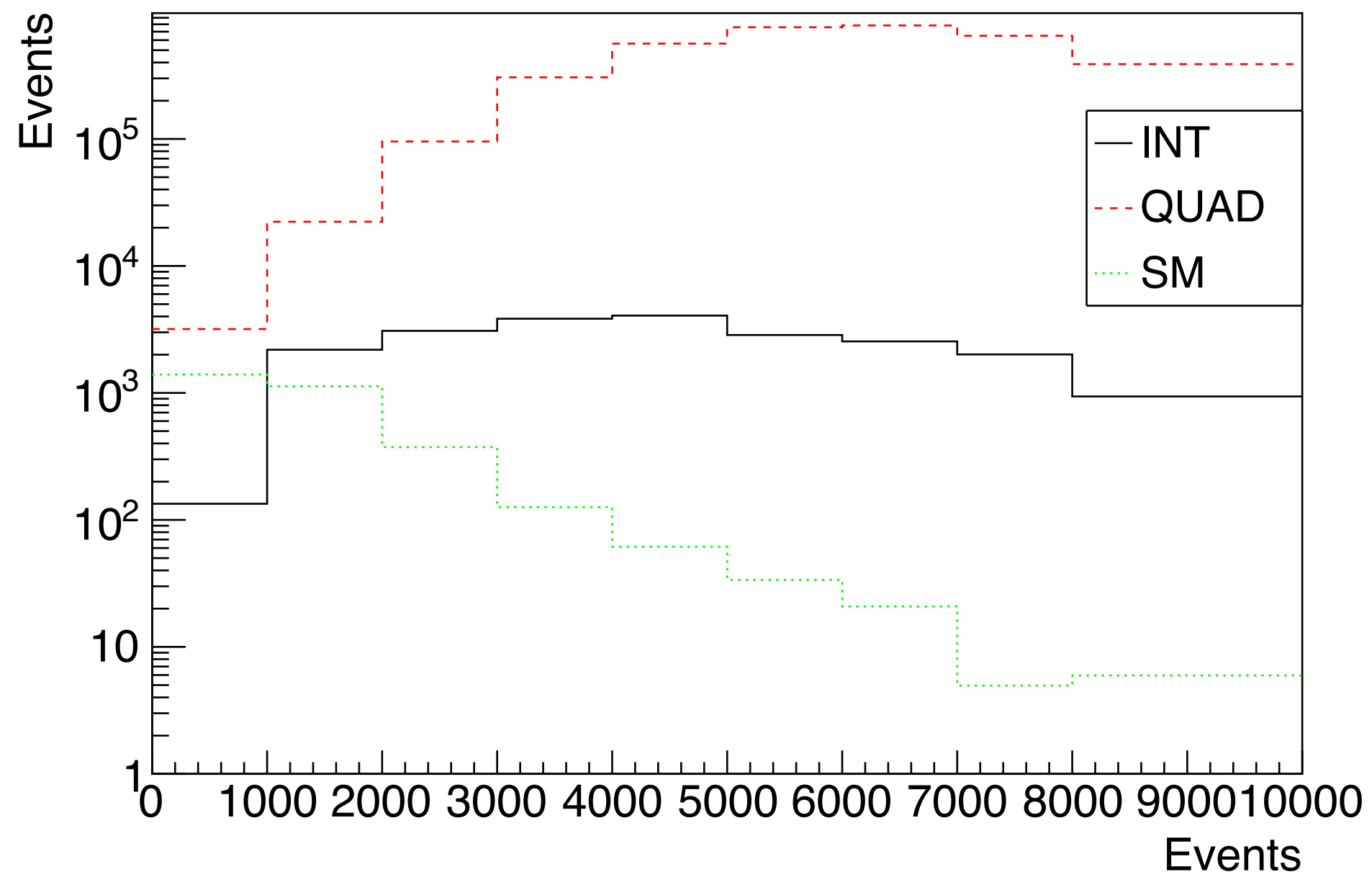


No inflection point

Original binning (left)  
Half binning (right)



Inflection Point



# Errors/Warnings

In initial run:

```
WARNING: updating results/mumu_vbs_mumu.root
[#1] INFO:Minization -- Including the following constraint terms in minimization: (constraint_mcstat_mumu_vbs_mjj_T2_lin_bin0,constraint_mcstat_mumu_vbs_mjj_T2_T2_quad_bin0)
[#1] INFO:Fitting -- RooAddition::defaultErrorLevel(nll_mumu_vbs_mumu_pdf_mumu_vbs_mumu_data_with_constr) Summation contains a RooNLLVar, using its error level
```

```
[#0] WARNING:Minization -- RooMinuitGlue: Minimized function has error status.
Returning maximum FCN so far (29.6928) to force MIGRAD to back out of this region. Error log follows
Parameter values: T2=2.01344, mcstat_mumu_vbs_mjj_T2_T2_quad_bin0=0, mcstat_mumu_vbs_mjj_T2_lin_bin0=0
RooProdPdf::mumu_vbs_mumu_pdf[ mumu_vbs_mjj_bin0_poisson * mumu_vbs_mjj_bin1_poisson * mumu_vbs_mjj_bin2_poisson * mumu_vbs_mjj_bin3_poisson * mumu_vbs_mjj_bin4_poisson *
mumu_vbs_mjj_bin5_poisson * mumu_vbs_mjj_bin6_poisson * mumu_vbs_mjj_bin7_poisson * mumu_vbs_mjj_bin8_poisson * constraint_mcstat_mumu_vbs_mjj_T2_lin_bin0 *
constraint_mcstat_mumu_vbs_mjj_T2_T2_quad_bin0 ]
    getLogVal() top-level p.d.f evaluates to zero @ !pdfs=(mumu_vbs_mjj_bin0_poisson = 0/1,mumu_vbs_mjj_bin1_poisson = 0/1,mumu_vbs_mjj_bin2_poisson =
0/1,mumu_vbs_mjj_bin3_poisson = 0/1,mumu_vbs_mjj_bin4_poisson = 0/1,mumu_vbs_mjj_bin5_poisson = 0/1,mumu_vbs_mjj_bin6_poisson = 0/1,mumu_vbs_mjj_bin7_poisson =
0/1,mumu_vbs_mjj_bin8_poisson = 0/1,constraint_mcstat_mumu_vbs_mjj_T2_lin_bin0 = 1,constraint_mcstat_mumu_vbs_mjj_T2_T2_quad_bin0 = 1)
```

In half binning run:

```
[#1] INFO:Minization -- RooFitResult::fillCorrMatrix: number of floating parameters is zero, correlation matrix not filled
[#1] INFO:Minization -- RooFitResult::fillCorrMatrix: number of floating parameters is zero, correlation matrix not filled
[#1] INFO:Minization -- RooFitResult::fillCorrMatrix: number of floating parameters is zero, correlation matrix not filled
[#1] INFO:Minization -- RooFitResult::fillCorrMatrix: number of floating parameters is zero, correlation matrix not filled
[#1] INFO:Minization -- RooFitResult::fillCorrMatrix: number of floating parameters is zero, correlation matrix not filled
```

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Half binning run did not include a nuisance parameter in bin 0 like the initial run did, not sure what caused this.

# Inputs and logs

Path: /work/cwaits/eft-fun\_troubleshooting on snowmass21

- log\_limits is the output of eft-fun for each run
- c\_scan\_T2.pdf is the log likelihood plot
- General/measurement configs are mumu\_vbs\_mumu.cfg/mumu\_vbs\_mumu\_mjj.cfg
- All input histograms provided

Run with: ./bin/eftfun.py -m scan -a -p T2 -c all -i configs/mumu\_vbs/mumu\_vbs\_mumu.cfg -w