Updated L1 Calo. Trigger Fast Simulation

(+ modified ATLFAST)

&

results from jet trigger studies

on H⟶ hh⟶ bbbb channel

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Reminder on L1CT package:

calorimeter response/resolution,

longitudinal/lateral energy sharing,

transition region (crack) effects

Low/High Luminosity pileup

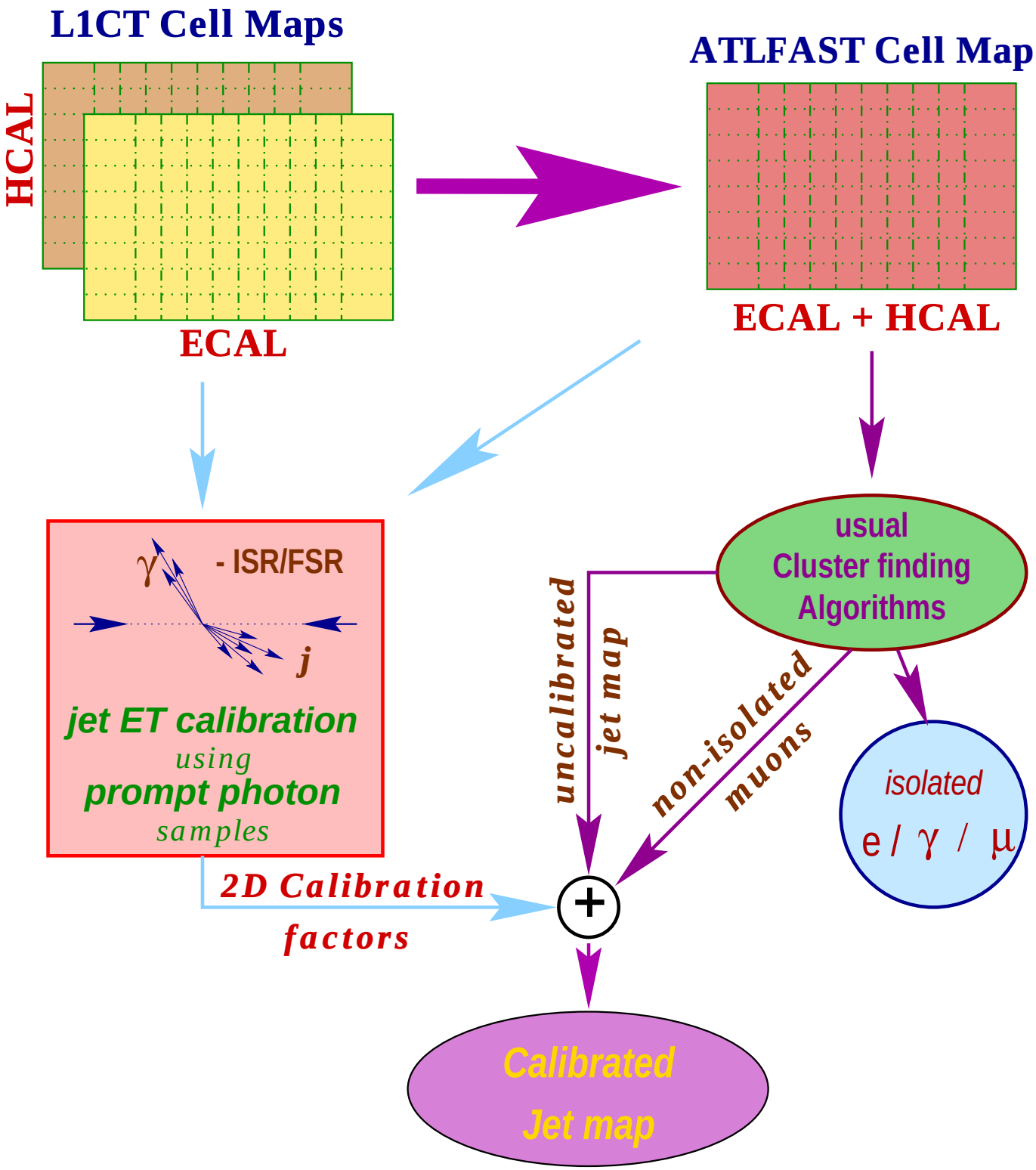
&

complete trigger chain/algorithms

Code available from URL:

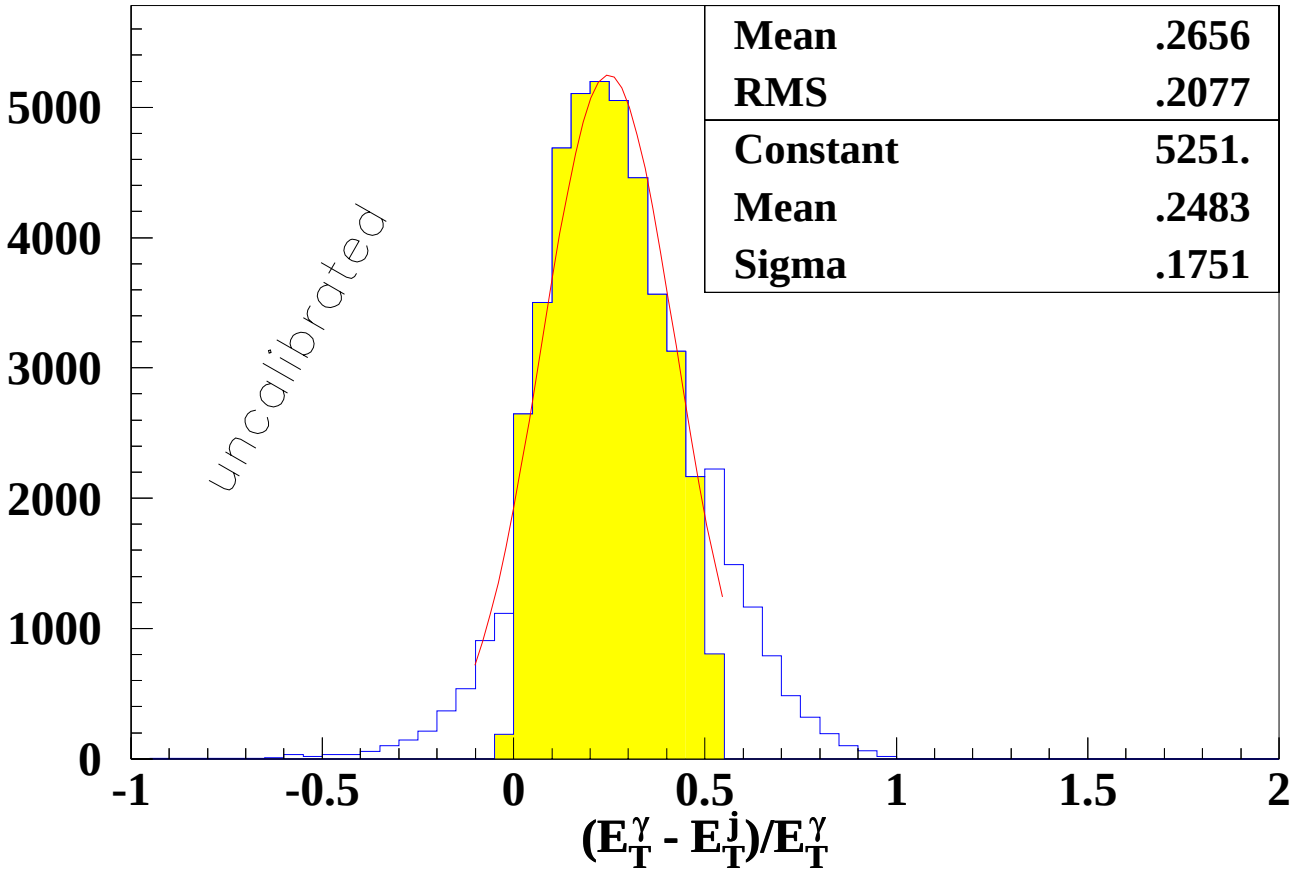
http://www.kip.uni-heidelberg.de/~mahboubi/l1ct.html

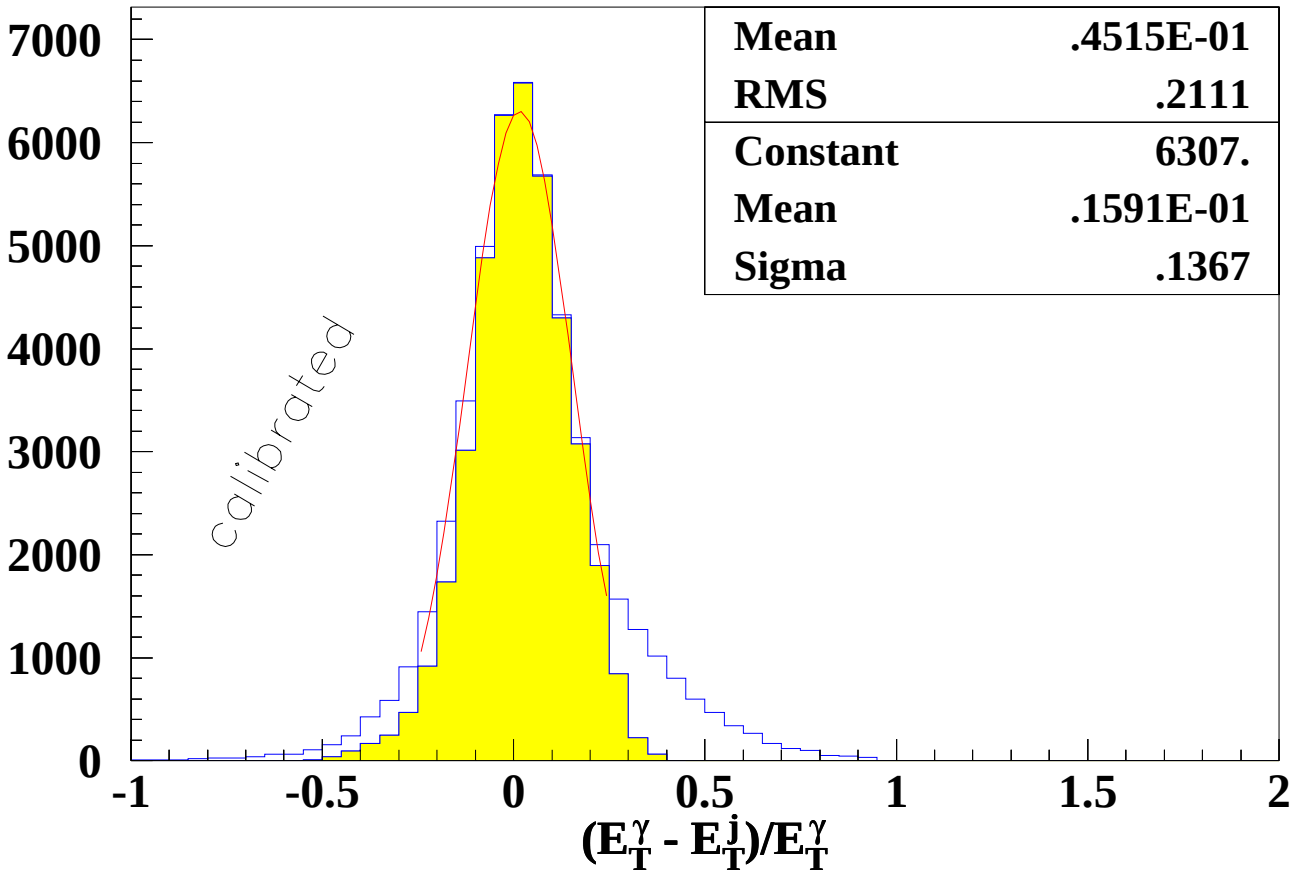
L1 Calo. Trigger Fast Simulation + Modified ATLFAST



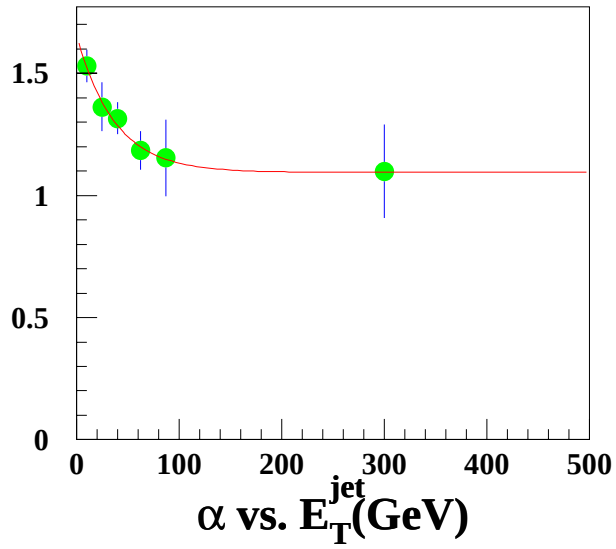
ATLFAST entities (except muons) are corrected for transition region effects

E_T^{jet} (calibrated) = $\alpha(E_T,\eta)$ ECAL + $\beta(E_T,\eta)$ HCAL

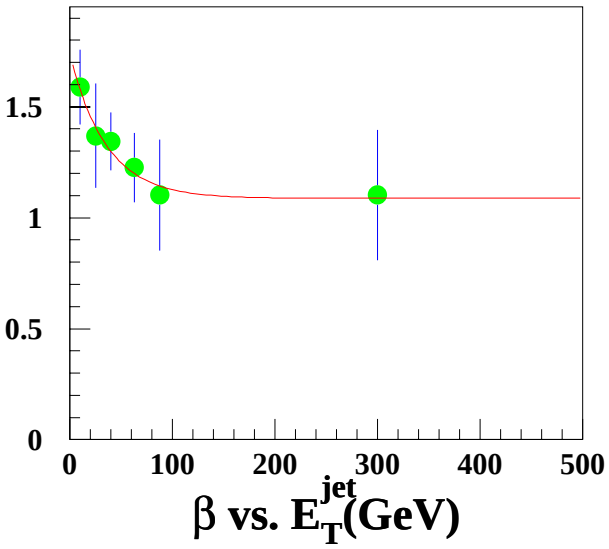




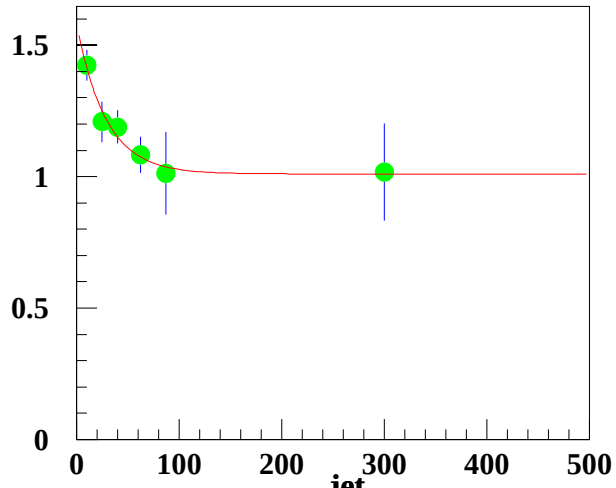
E_T^{jet}(calibrated) = $\alpha(E_T,\eta)$ ECAL + $\beta(E_T,\eta)$ HCAL



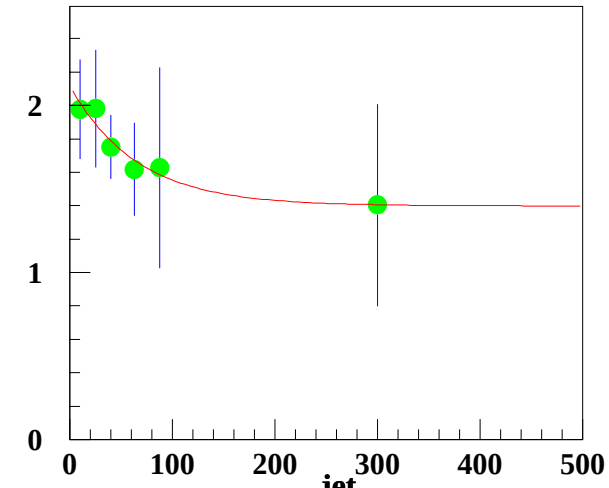
α vs. E_T^{jet}(GeV)



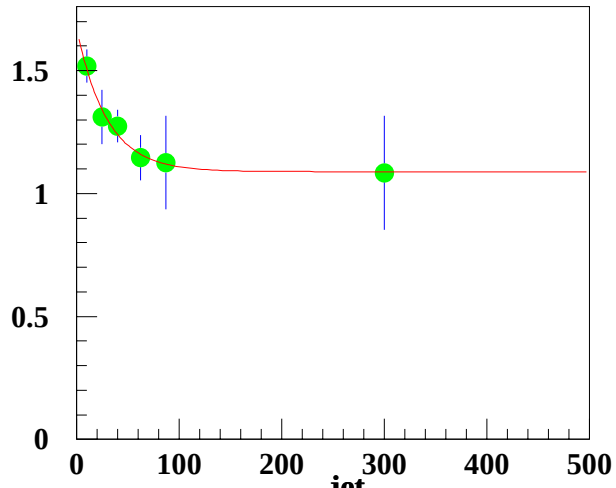
β vs. E_T^{jet}(GeV)



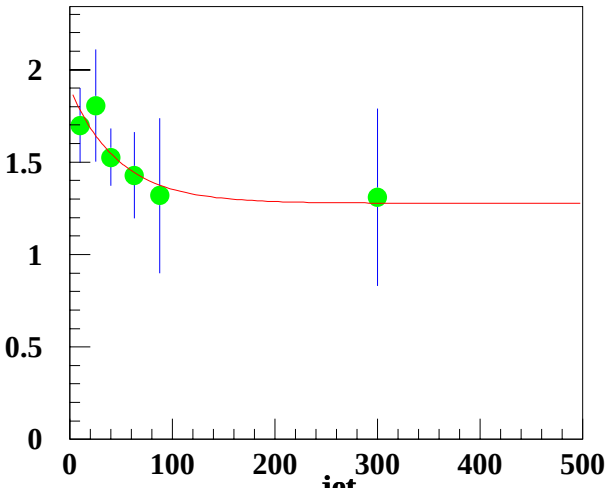
α vs. E_T^{jet}(GeV)



β vs. E_T^{jet}(GeV)

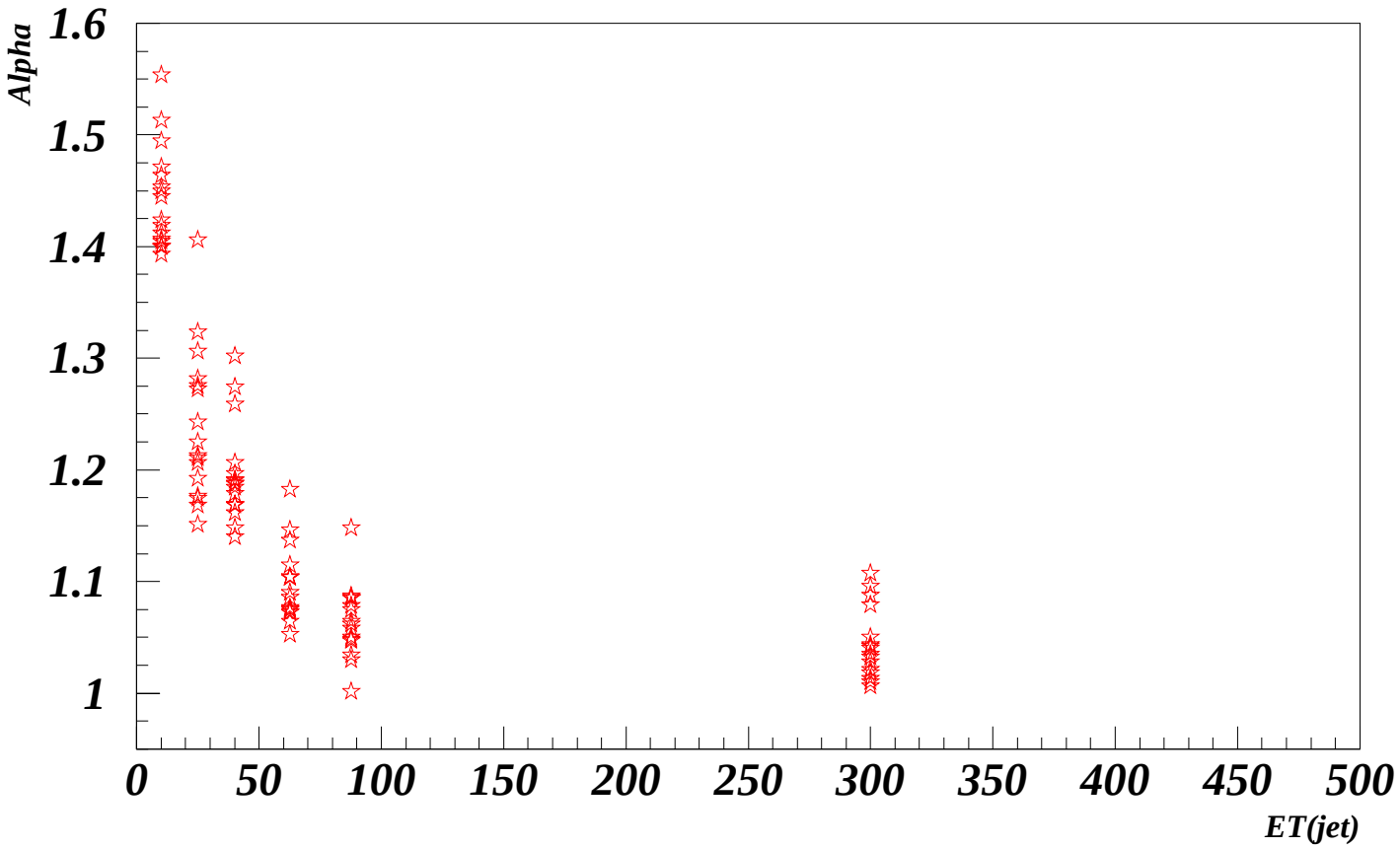


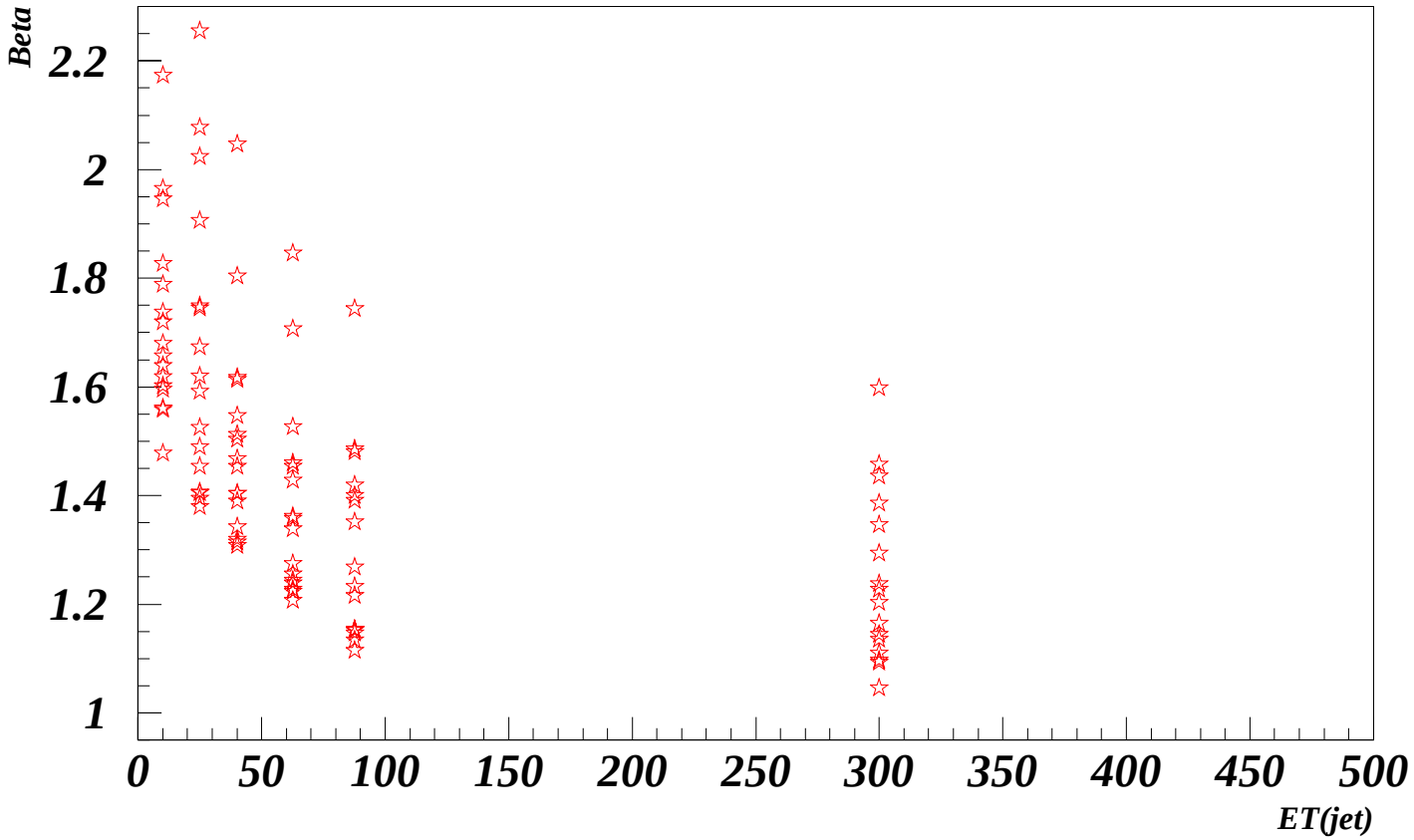
α vs. E_T^{jet}(GeV)

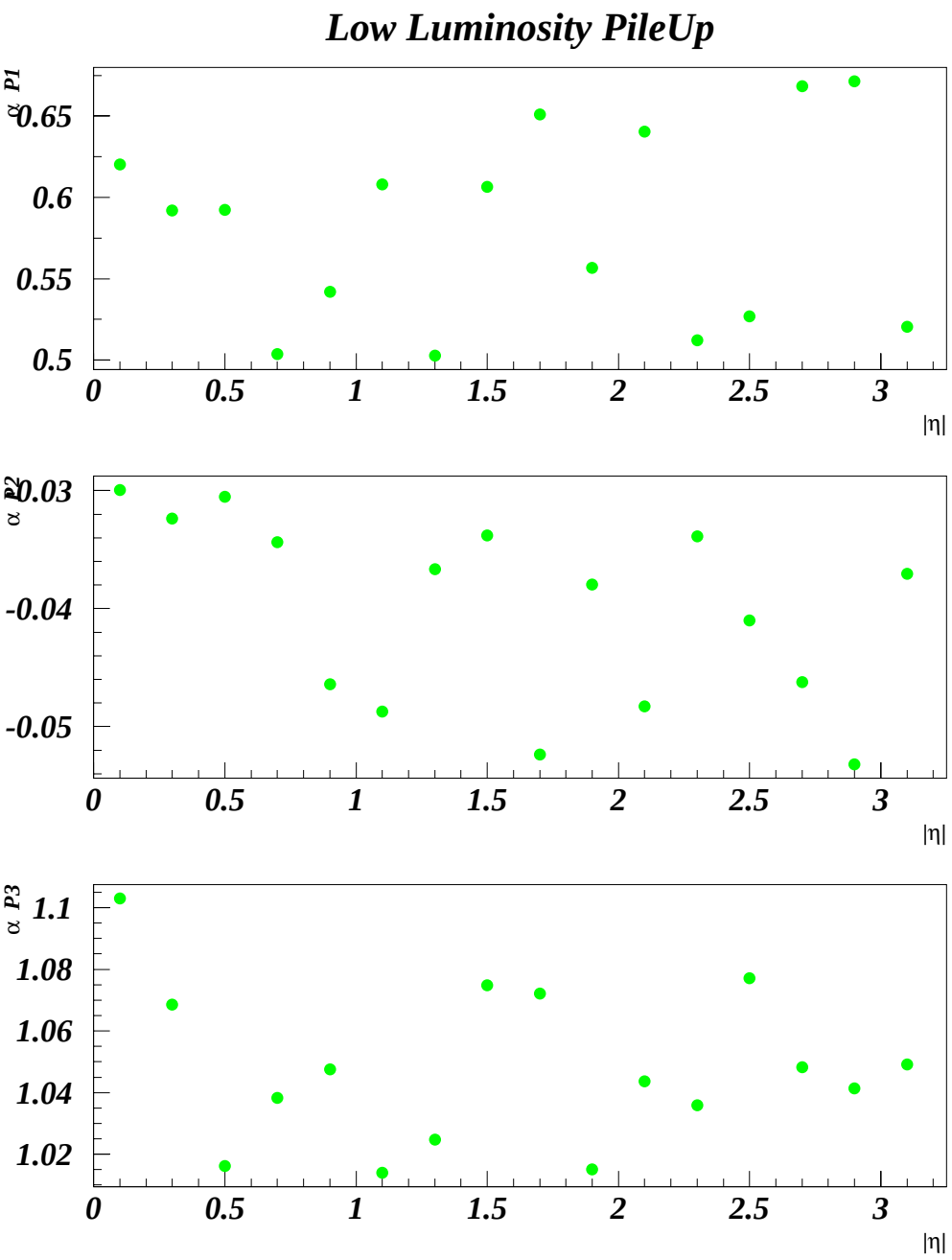


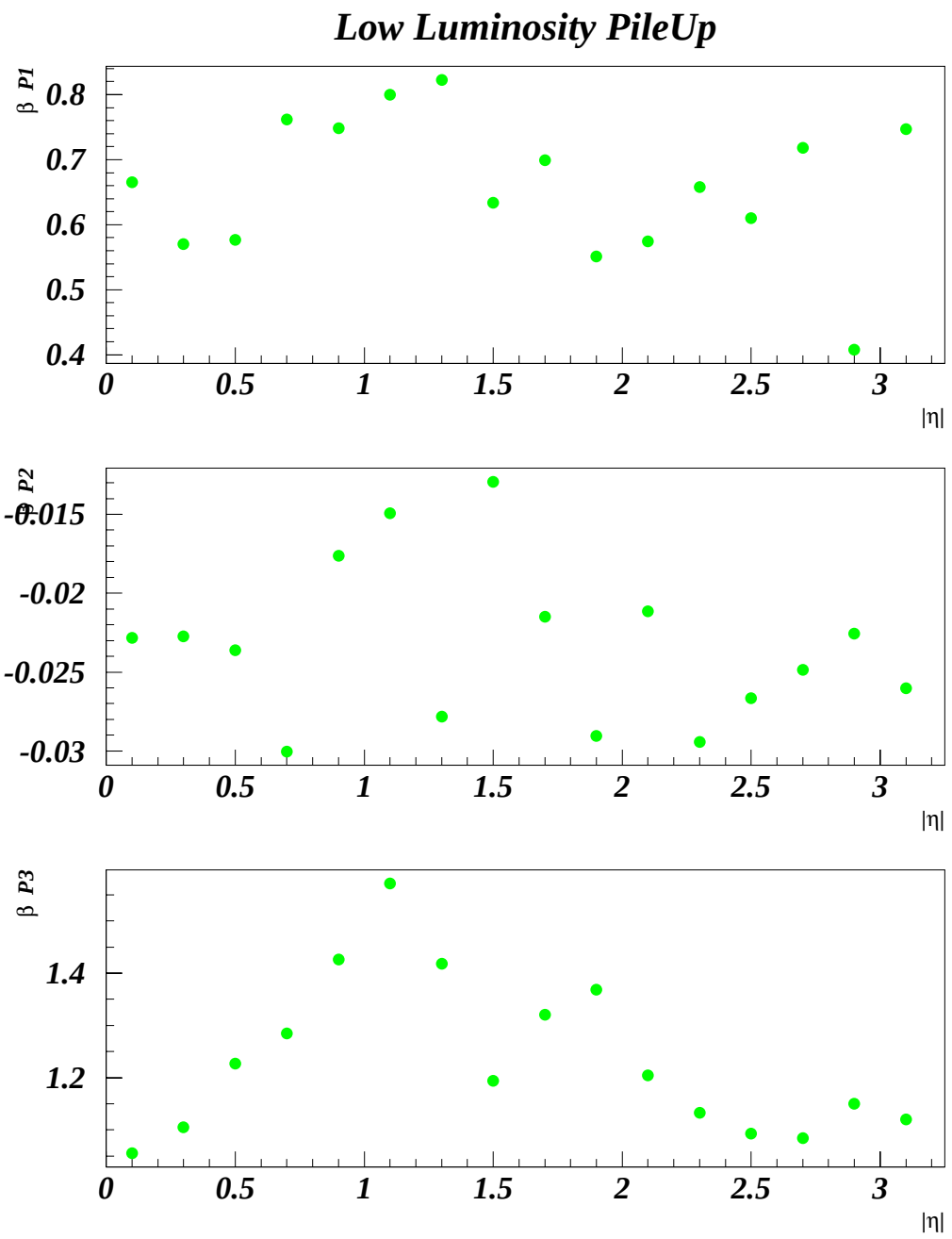
β vs. E_T^{jet}(GeV)

Low Luminosity PileUp

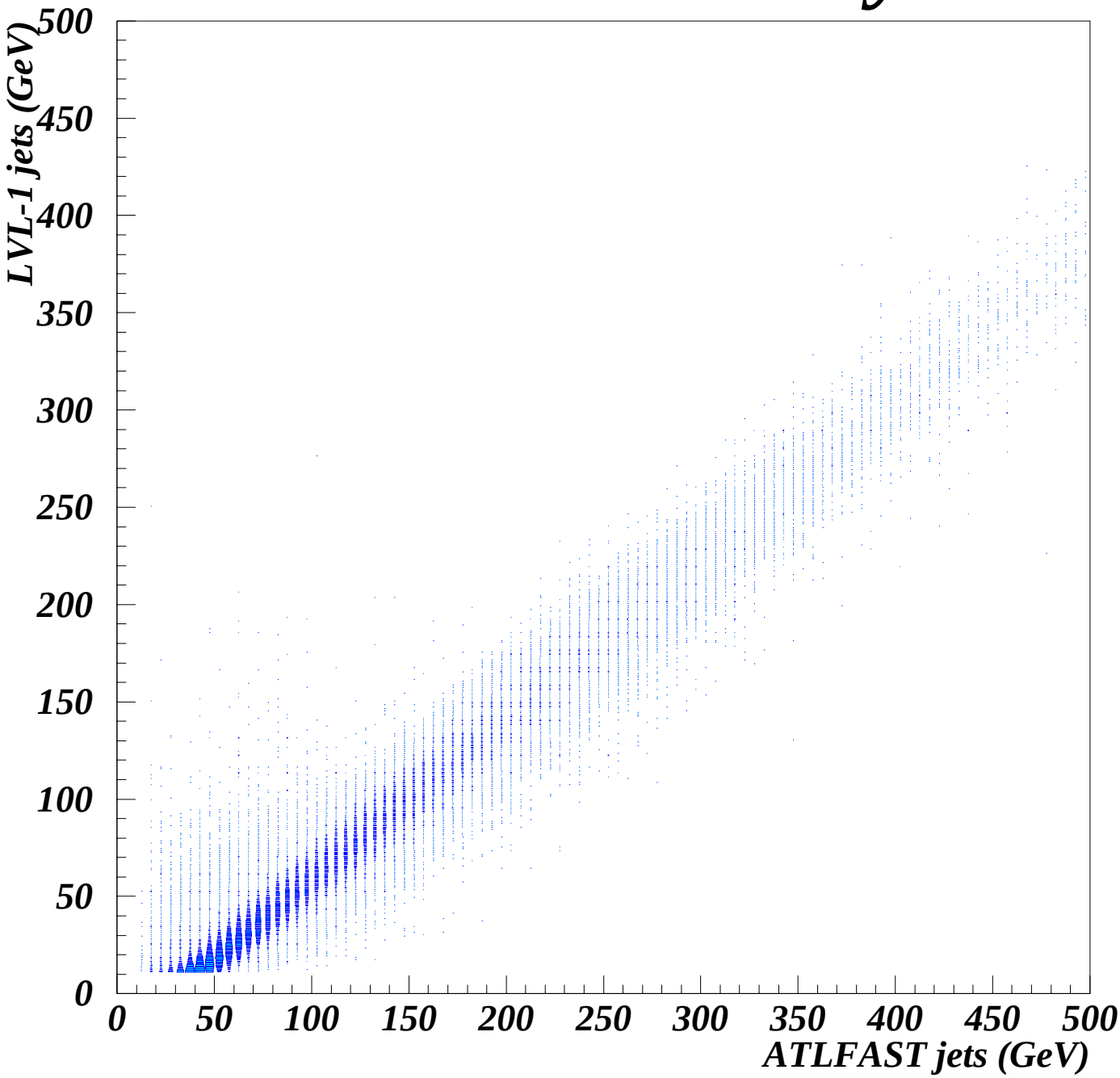




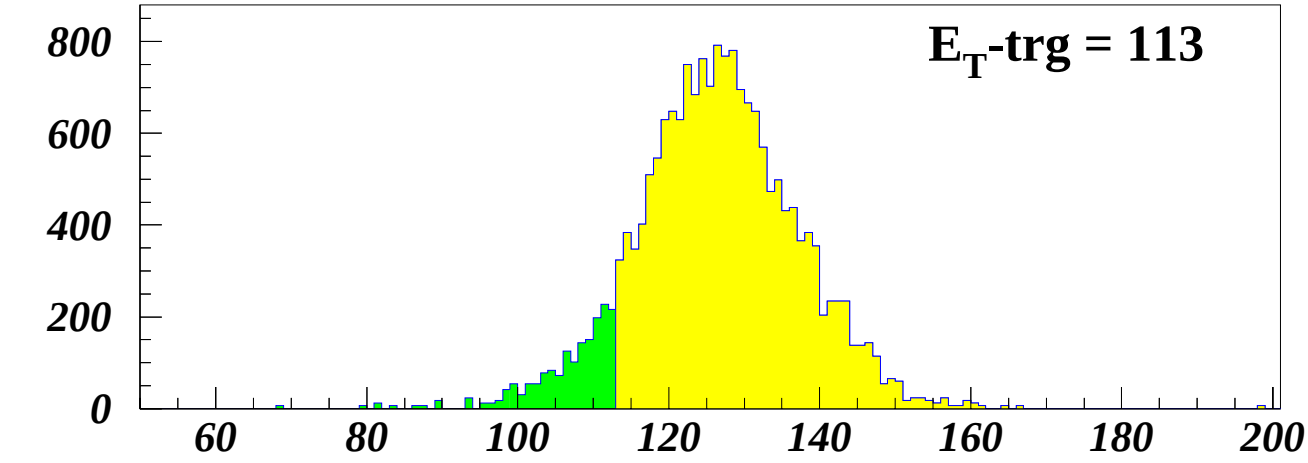

Low Luminosity PileUp
α P1
0.65
0.6
0.55
0.5
0
0.5
1
1.5
2
2.5
3
|η|
α P2
-0.03
-0.04
-0.05
α P3
1.1
1.08
1.06
1.04
1.02

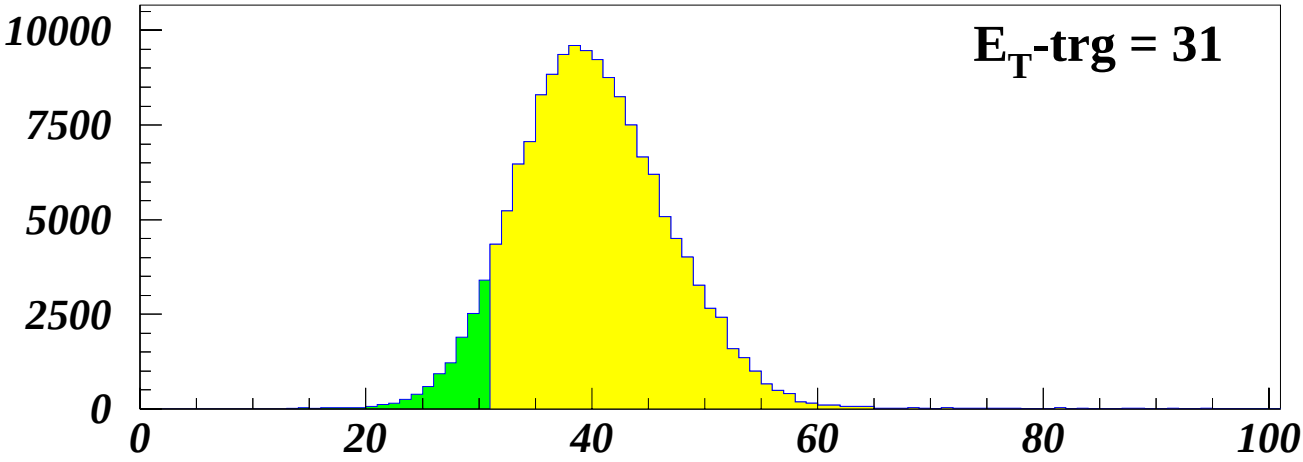

Low Luminosity PileUp
β P1
0.8
0.7
0.6
0.5
0.4
0
0.5
1
1.5
2
2.5
3
|η|
β P2
-0.015
-0.02
-0.025
-0.03
β P3
1.4
1.2

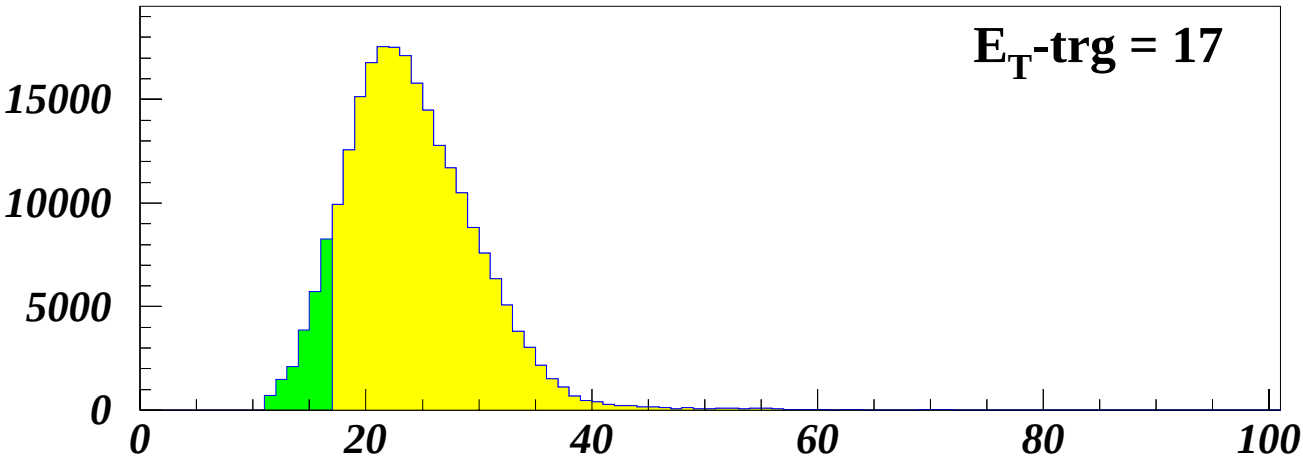
Low Luminosity



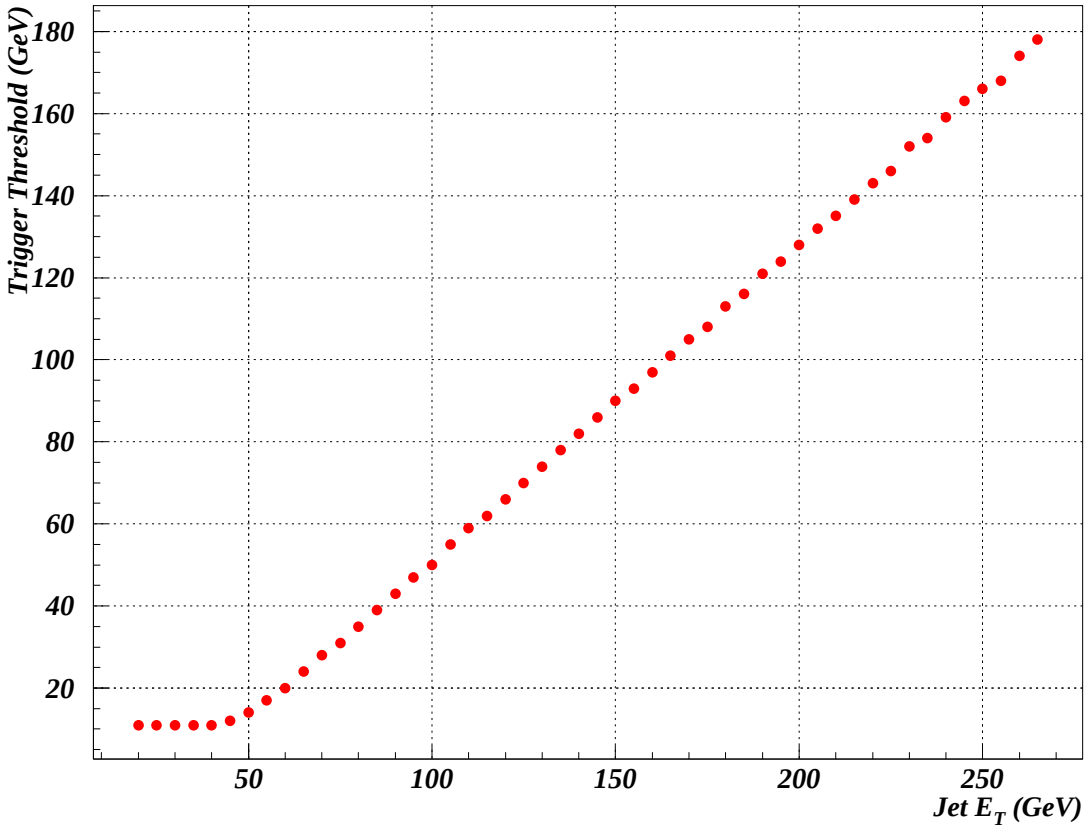
Low Luminosity



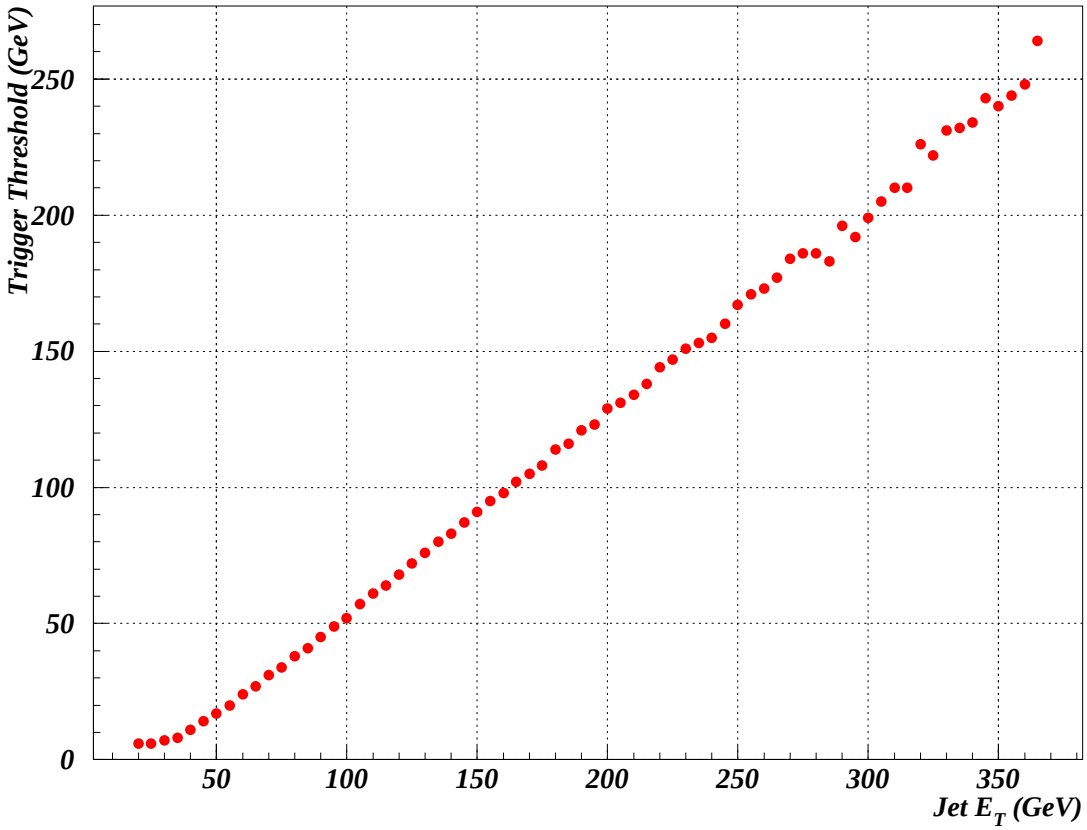


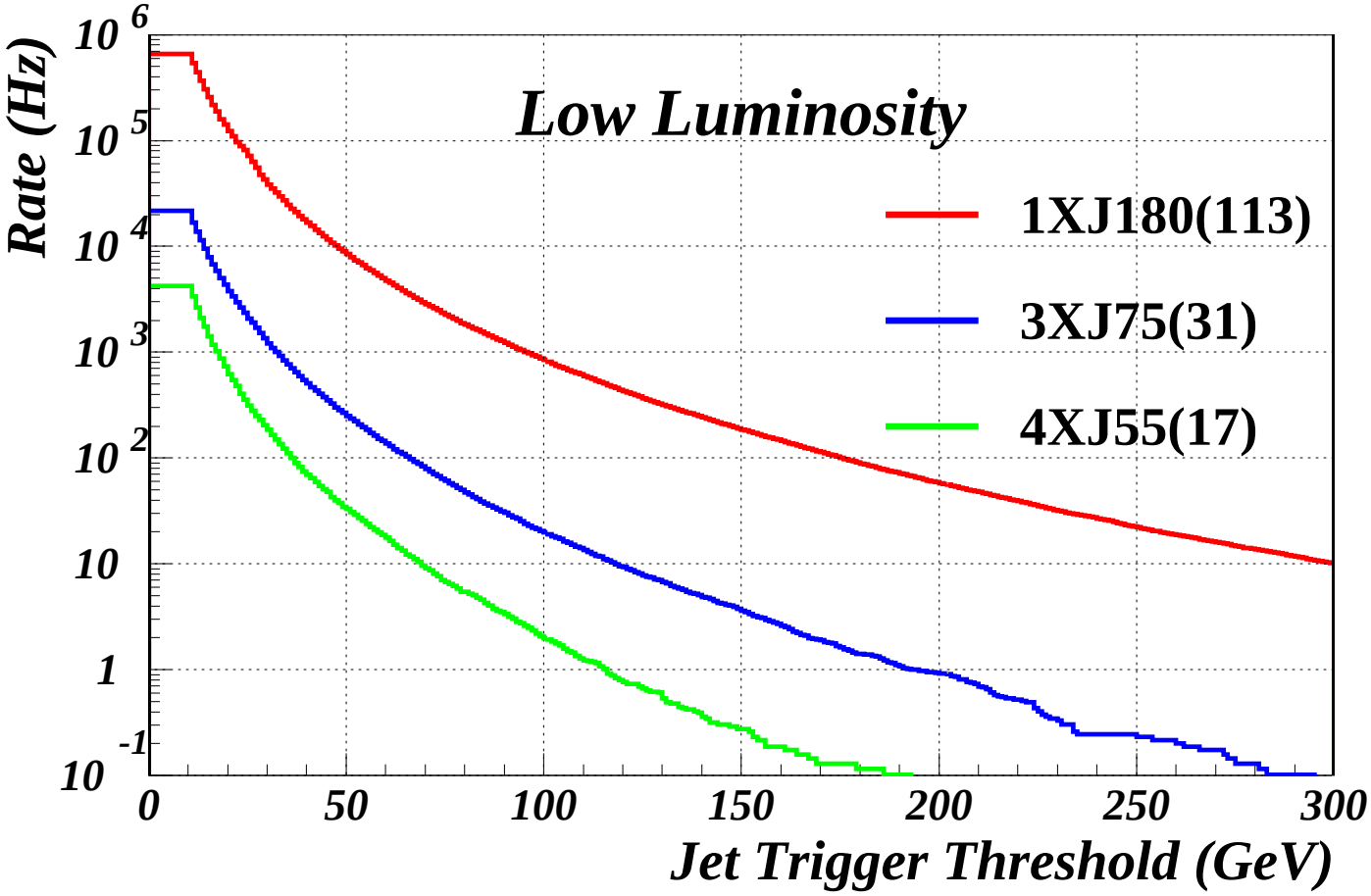


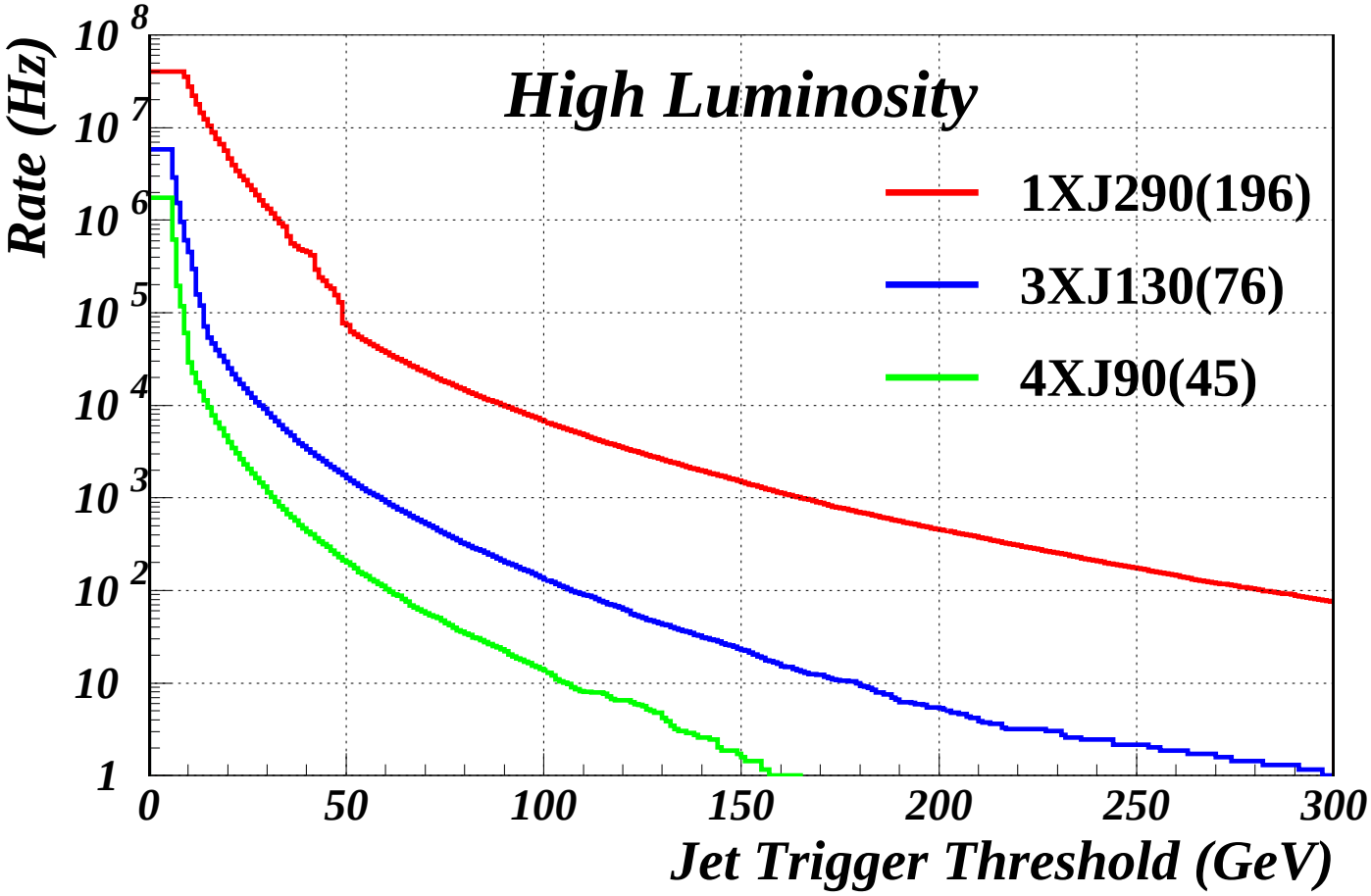
Low Luminosity

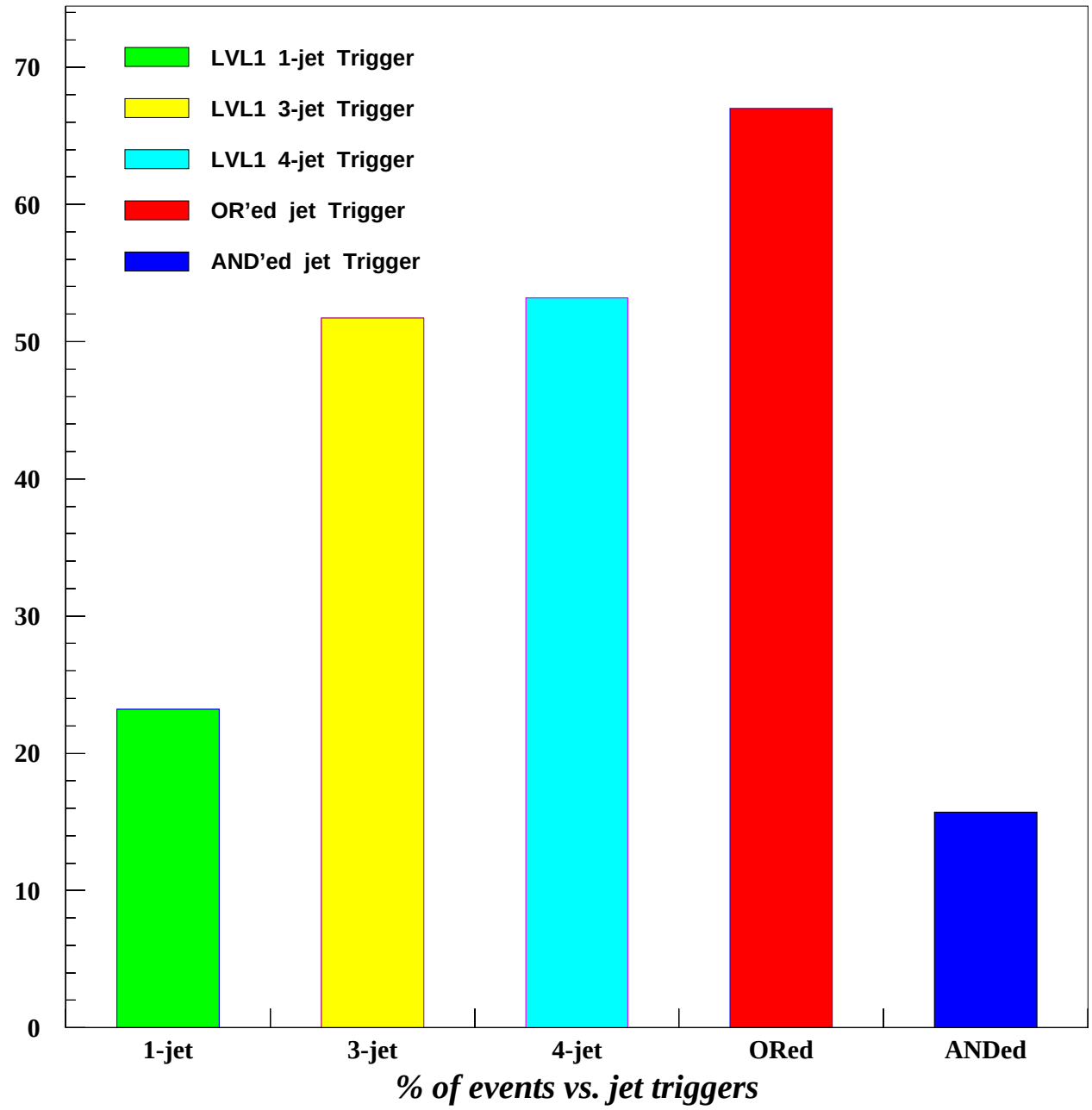


High Luminosity




Low Luminosity
1XJ180(113)
3XJ75(31)
4XJ55(17)
Rate (Hz)
Jet Trigger Threshold (GeV)


High Luminosity
1XJ290(196)
3XJ130(76)
4XJ90(45)
Rate (Hz)
Jet Trigger Threshold (GeV)


tan(β)=3.0, m_h~99GeV, m_H~300GeV, Low Lumi.
LVL1 1-jet Trigger
LVL1 3-jet Trigger
LVL1 4-jet Trigger
OR'ed jet Trigger
AND'ed jet Trigger
70
60
50
40
30
20
10
0
1-jet
3-jet
4-jet
ORed
ANDed
% of events vs. jet triggers

SIGNAL ACCEPTANCE

(Level-1 Jet Trigger effect)

Low Luminiosity

tan β	off-line acceptance	LVL1-Calo. acceptance	LVL1 + off-line acceptance
1.5	2.04%	67.57%	1.6%
3.0	1.99%	67.04%	1.5%

~ 20%

High Luminiosity

tan β	off-line acceptance	LVL1-Calo. acceptance	LVL1 + off-line acceptance
1.5	0.32%	8.8%	0.044%
3.0	0.30%	7.7%	0.033%

~ 85%

Reduced LVL1 jet trigger thresholds

High Luminosity

1XJ : 250 3XJ : 100 4XJ : 70

tan β	off-line acceptance	LVL1-Calo. acceptance	LVL1 + off-line acceptance
1.5	0.32%	25.9%	0.14%
3.0	0.30%	24.4%	0.12%

~ 60%

1XJ : 225 3XJ : 85 4XJ : 60

tan β	off-line acceptance	LVL1-Calo. acceptance	LVL1 + off-line acceptance
1.5	0.32%	38.3%	0.19%
3.0	0.30%	36.8%	0.17%

~ 40%