



Implications of punchthrough for SUSY searches

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- Preselection as defined in SUSY RA2 Wiki
- Met corrected not only for jets but for muons as well
(#Events $\text{MET}_{\mu, \text{Corr}} > 200$)

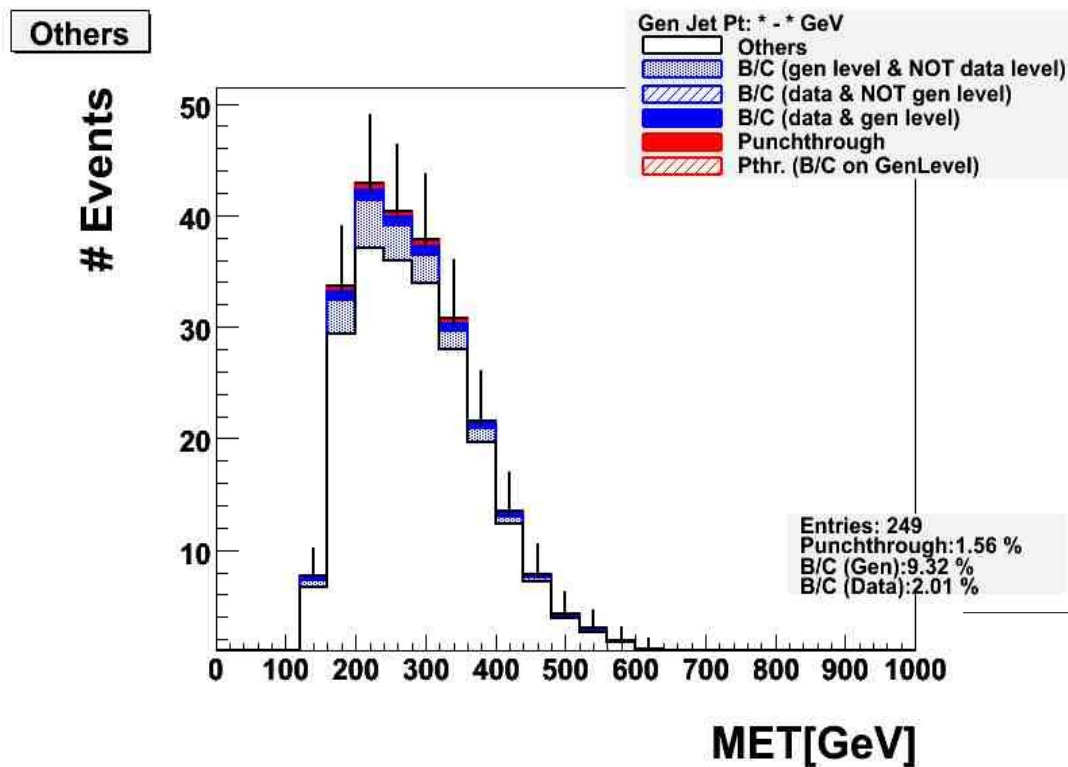
Signal:

100 pb-1	SUSY LM1	SUSY LM4
Ulla (>200)	249 (207)	145(122)
Hamburg	254	---

- Punchthrough and B/C Tags used here for event cleaning as defined in my talk in our last SUSY meeting

Background:

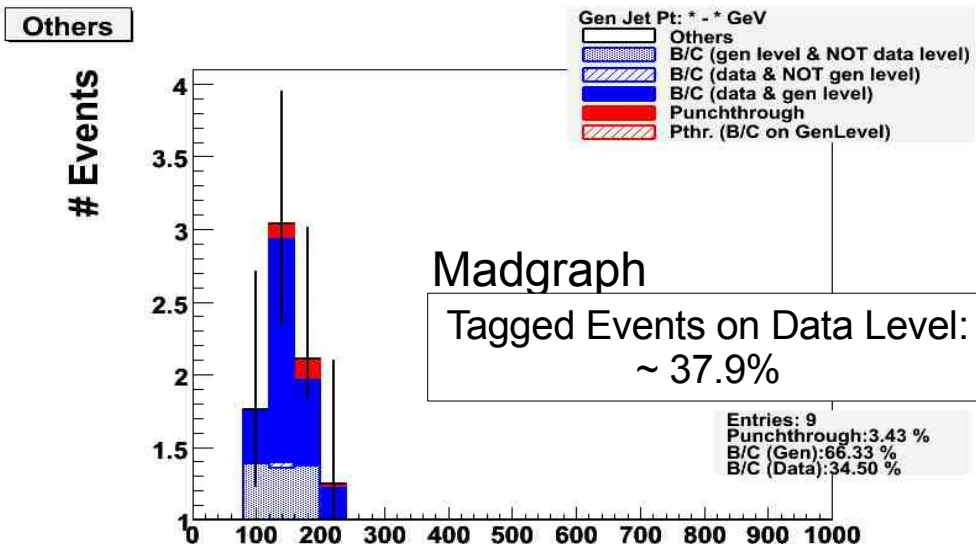
100 pb-1	QCD(Herwig)	QCD(Pythia)	QCD (Madgraph)	Z invisible	Z jets	W jets
Ulla (>200)	36(9)	14(2)	9(1)	12(8)	0(0)	13(8)
Hamburg	36	12	9	12	---	14



- RA2 preselection cuts applied
- In plots: Additional correction of Met with muon corrections

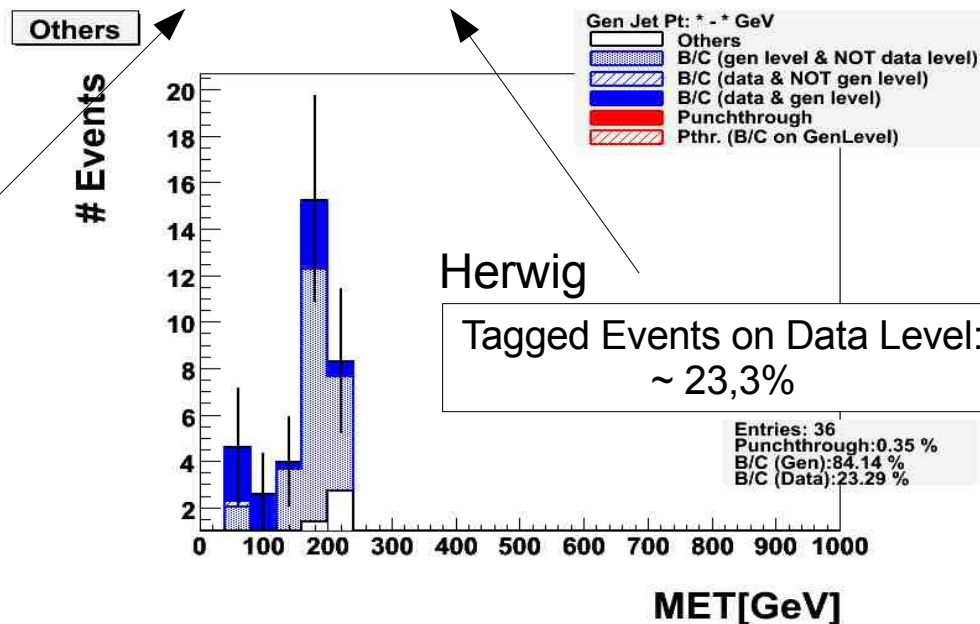
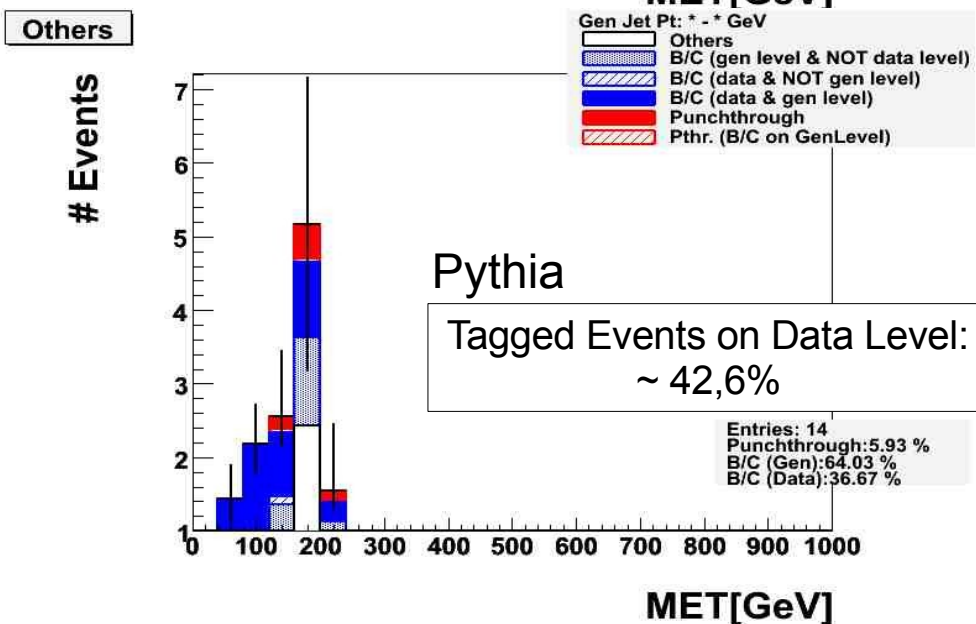
Tagged Events on Data Level:
~ 3.6%

Would be removed in Punchthrough/ B/C Event Cleaning
(or (partially) corrected in case of Punchthrough)



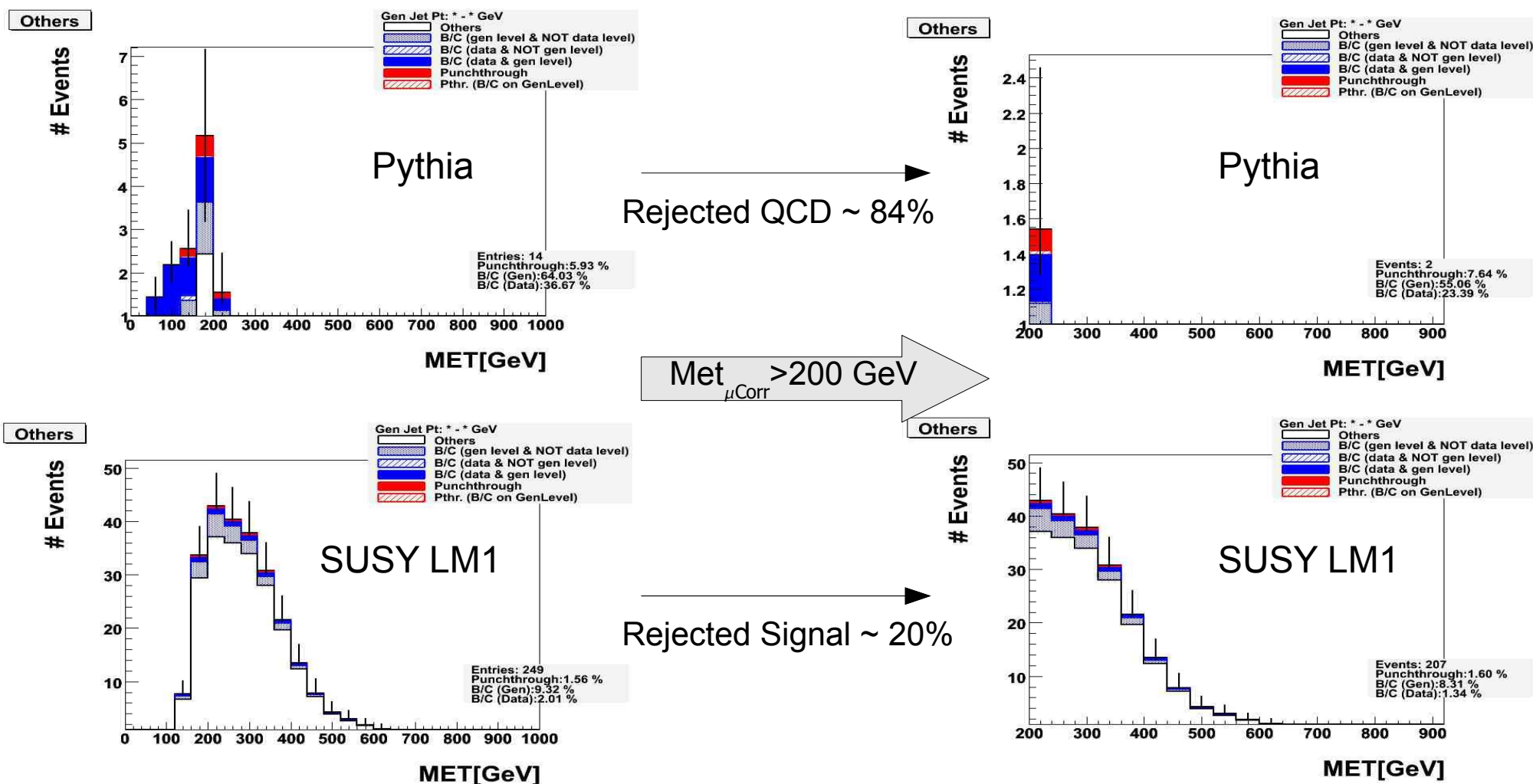
- RA2 preselection cuts applied
- In plots: Additional correction of Met with muon corrections

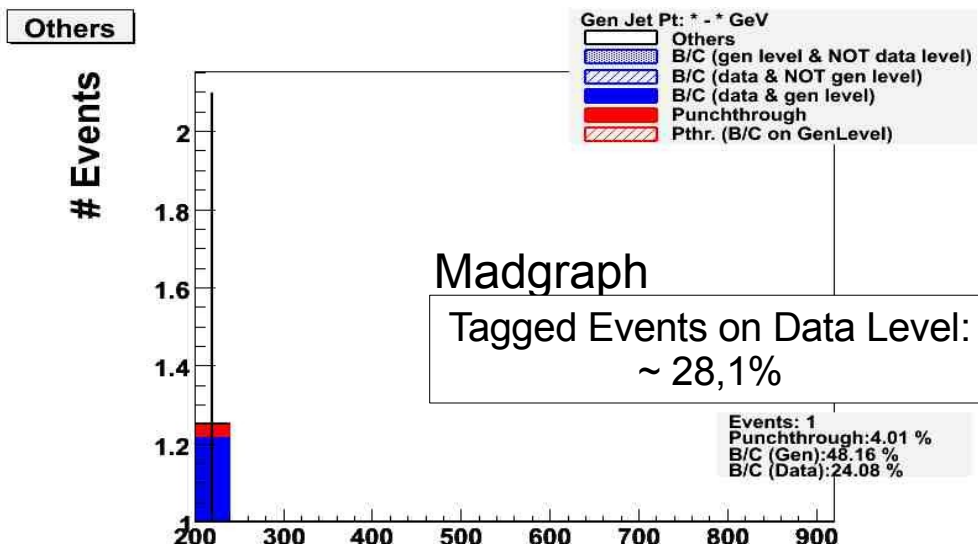
Event Cleaning reduces QCD Background for RA2
~ 23-43 %
Event Cleaning reduces LM1 Signal for RA2
~ 3-4 %



Add Met Muon Corrections

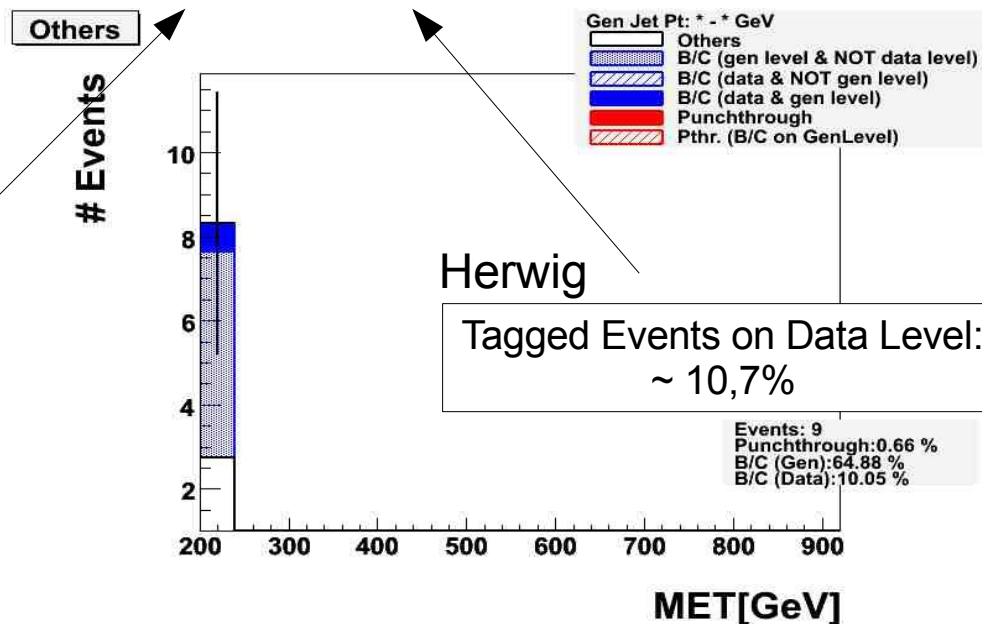
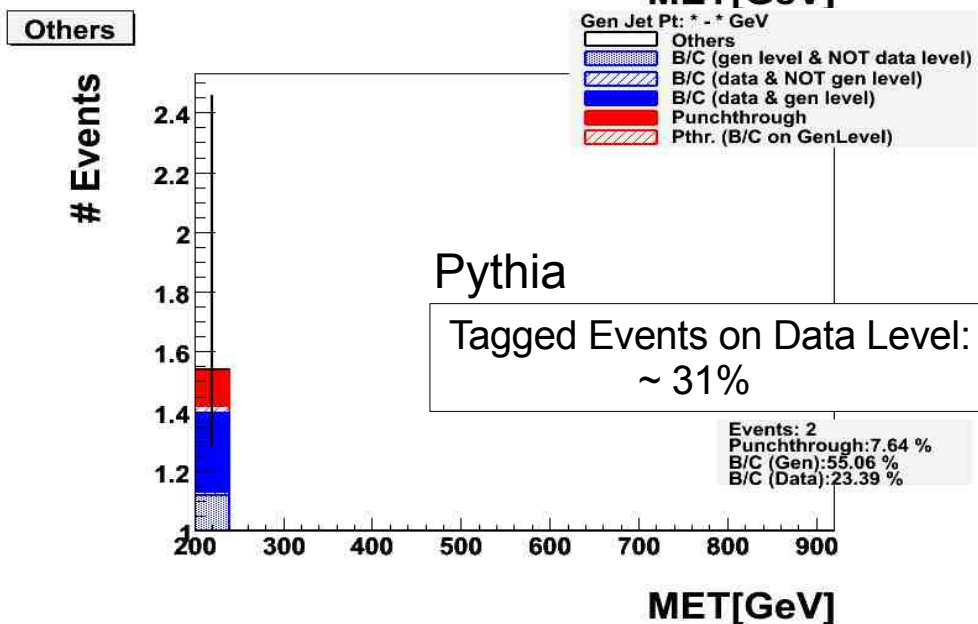
- Applying cut on muon corrected met would improve S/B as well
- Is there a reason why the corrections aren't used yet?





- RA2 preselection cuts applied
- Additional cut on muon corrected MET
 $MET_{\mu Corr} > 200 \text{ GeV}$

Event Cleaning reduces QCD Background for RA2
~ 10-30 %
Event Cleaning reduces LM1 Signal for RA2
~ 3 %





Summary I



100 pb-1	SUSY LM1	SUSY LM4	QCD(Herwig)	QCD(Pythia)	QCD (Mad)	Wjets	Zinv.
Events	249	145	36	14	9	12	13
Punchthrough	1,6%	1,8%	0,4%	5,9%	3,4%	0,0%	0,0%
B/C (Gen)	9,3%	10,1%	84,1%	64,0%	66,3%	3,1%	0,0%
B/C (Data)	2,0%	24,0%	23,3%	36,7%	34,5%	3,1%	0,0%
S/B (RA2, LM1)			4,08	6,38	7,32		
S/B (RA2+Clean _{Punchthr.,B/C} , LM1)			4,61	7,35	7,94		
S/B (RA2, LM4)			2,38	3,72	4,26		
S/B (RA2+Clean _{Punchthr.,B/C} , LM4)			2,07	3,29	3,56		

Additional cut on muon corrected MET: $\text{MET}_{\mu\text{Corr}} > 200 \text{ GeV}$

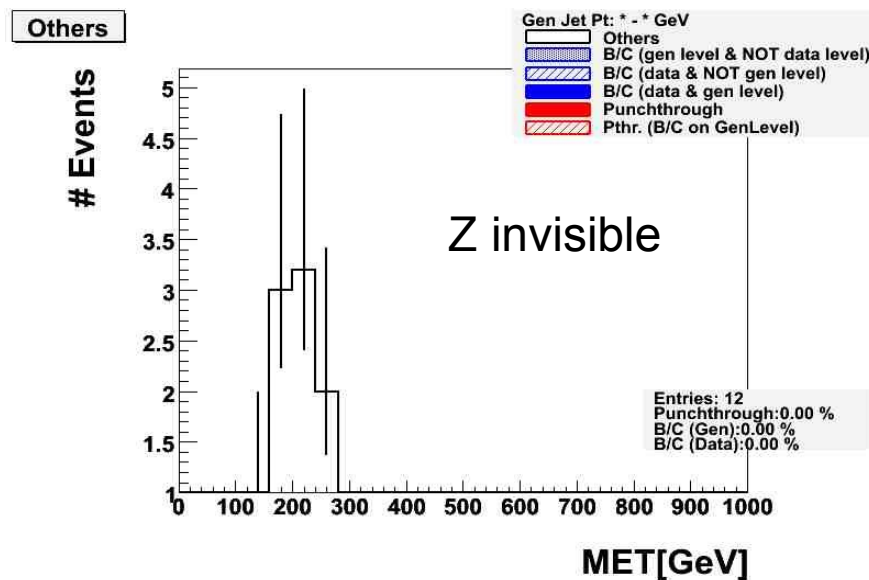
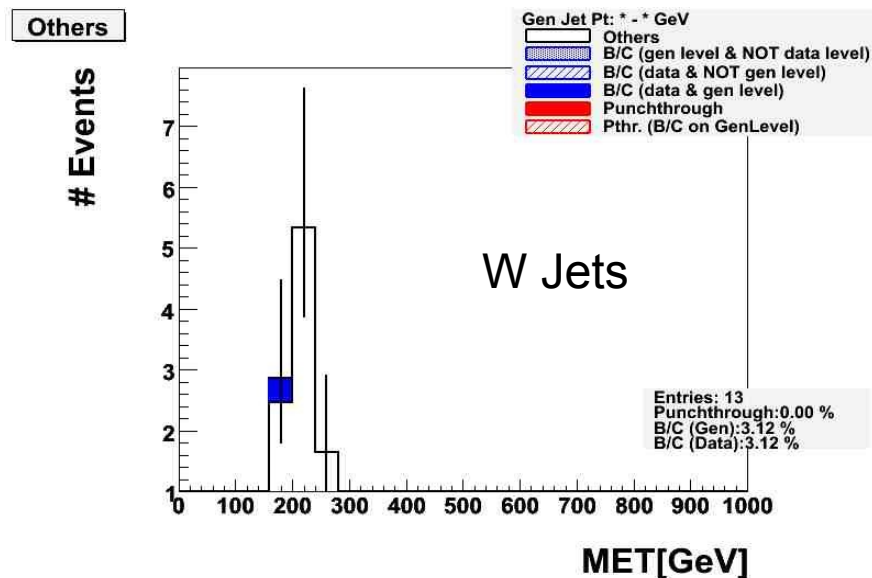
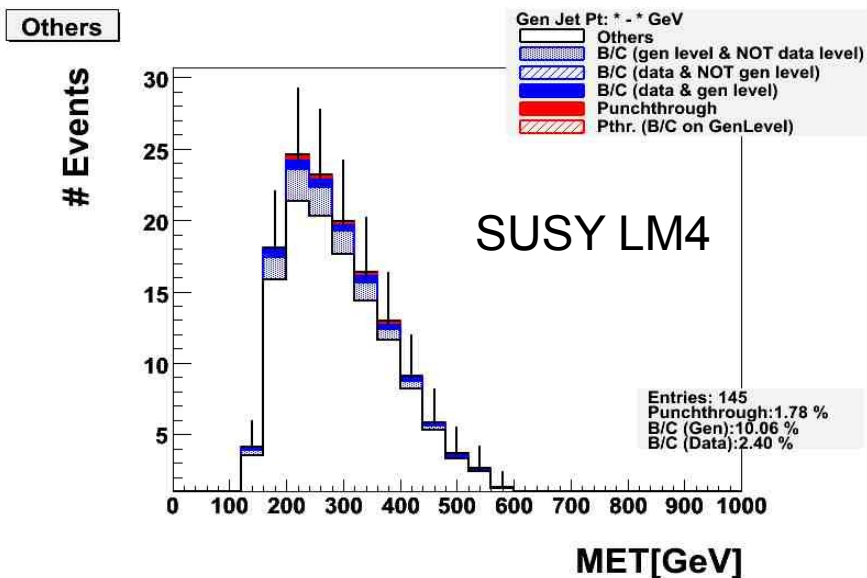
100 pb-1	SUSY LM1	SUSY LM4	QCD(Herwig)	QCD(Pythia)	QCD (Mad)	Wjets
Events	207	122	9	2	1	0
Punchthrough	1,6%	1,9%	0,7%	7,8%	4,0%	0,0%
B/C (Gen)	8,3%	9,2%	64,9%	55,1%	48,2%	0,0%
B/C (Data)	1,3%	1,8%	10,1%	23,4%	24,1%	0,0%
S/B (RA2, LM1)			12,18	20,7	23	
S/B (RA2+Clean _{Punchthr.,B/C} , LM1)			12,53	21,43	23,04	
S/B (RA2, LM4)			7,18	12,2	13,56	
S/B (RA2+Clean _{Punchthr.,B/C} , LM4)			7,33	12,53	13,48	



MET Distributions



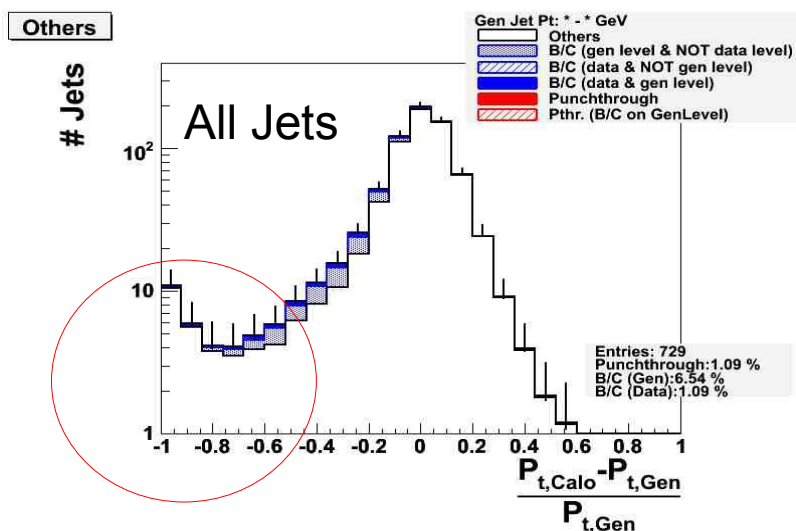
MET Distributions (Others)





Jet Resolutions



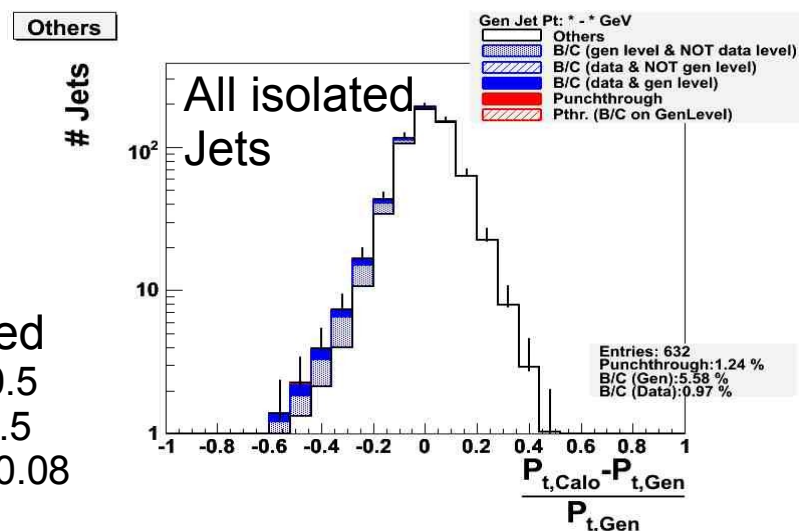


Jet isolation applied

ΔR (next CaloJet) > 0.5

ΔR (next GenJet) > 0.5

ΔR (Calo/Gen Jet) < 0.08



Jet Resolution (Others, No isolation (All jets))

