First look into ttbar samples

Higgs/Top Performance meeting

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May 13, 2024

Introduction

- First quick look at the samples, mainly to check that there's nothing obviously problematic
- Some gen-level studies and reco-level distributions
- Basis for developing a proper sensitivity study

- Starting with (supposedly) most sensitive semileptonic channel
- Winter 2023 semileptonic samples

wzp6_ee_WbWb_semihad_ecm345	1,200,000

Acceptance checks vs ecm

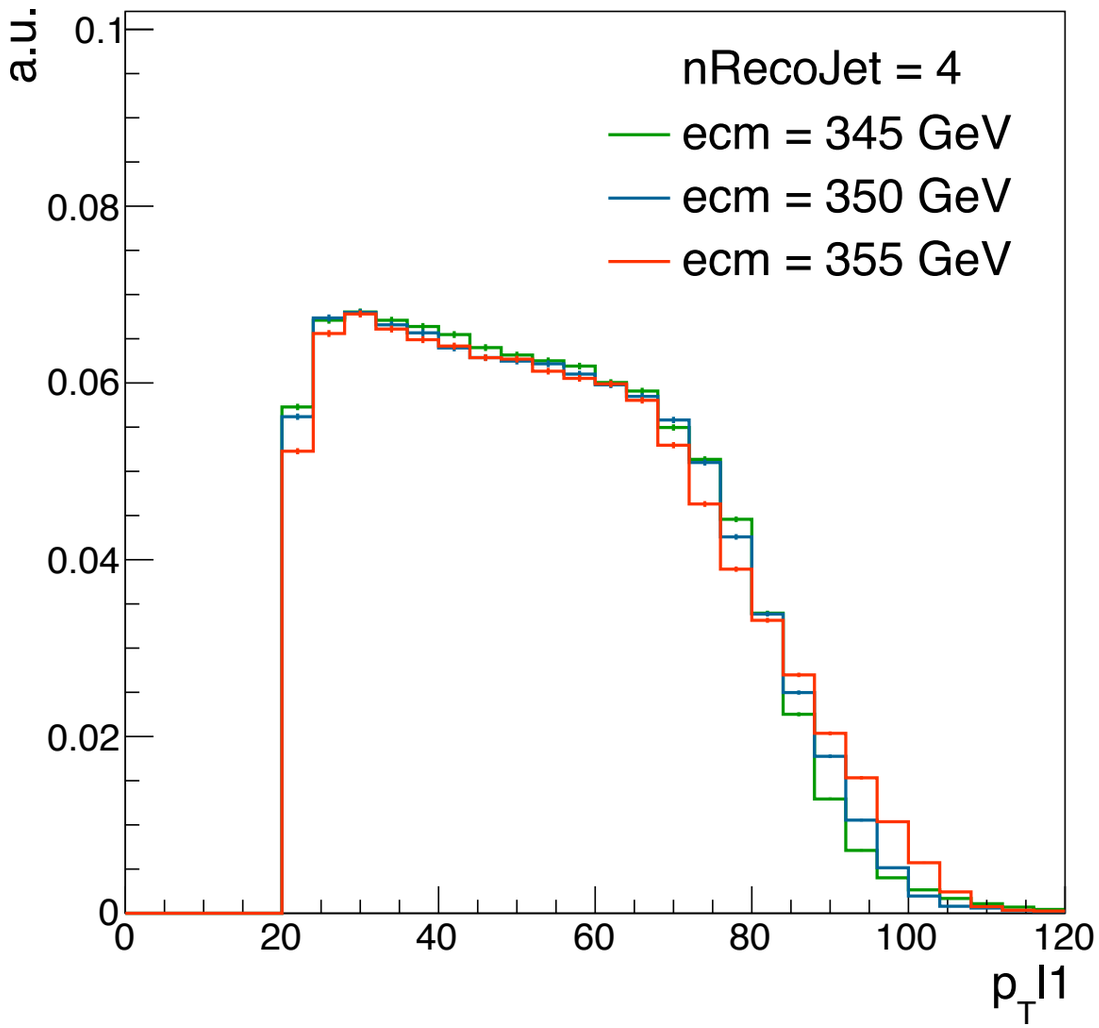
- Status 1 leptons (what should we do with status 2? See Zohre's slides)
- No cuts at reco level

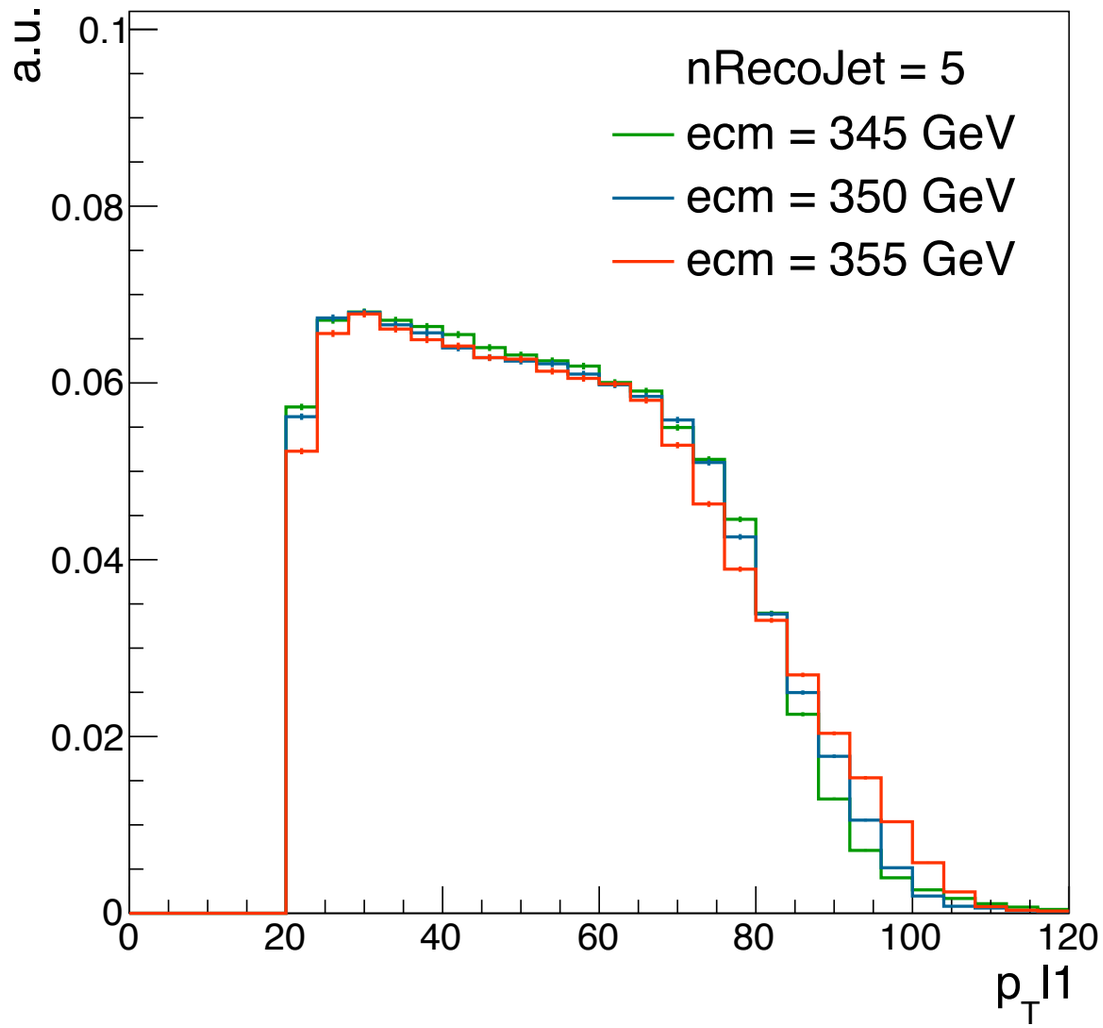
Scenario	Acceptance (ecm 345)	Acceptance (ecm 350)	Acceptance (ecm 355)
1l, pt(l) > 20	0,4697	0,4682	0,4681
+ ngenquarks > 3	0,4667	0,4656	0,4655
+ pt(q) > 10	0,4650	0,4642	0,4642
>1l, pt(l) > 20	0,8362	0,8367	0,8374
>1l, pt(l) > 15	0,8897	0,8906	0,8907
>1l, pt(l) > 10	0,9270	0,9279	0,9276
>1l, pt(l) > 5	0,9572	0,9577	0,9577

- Very small ecm dependence in all cases
- Will optimise p cuts for next round (also checking backgrounds)

Reco level: lepton momentum

- At least one isolated lepton with p > 20 and njet =4/5

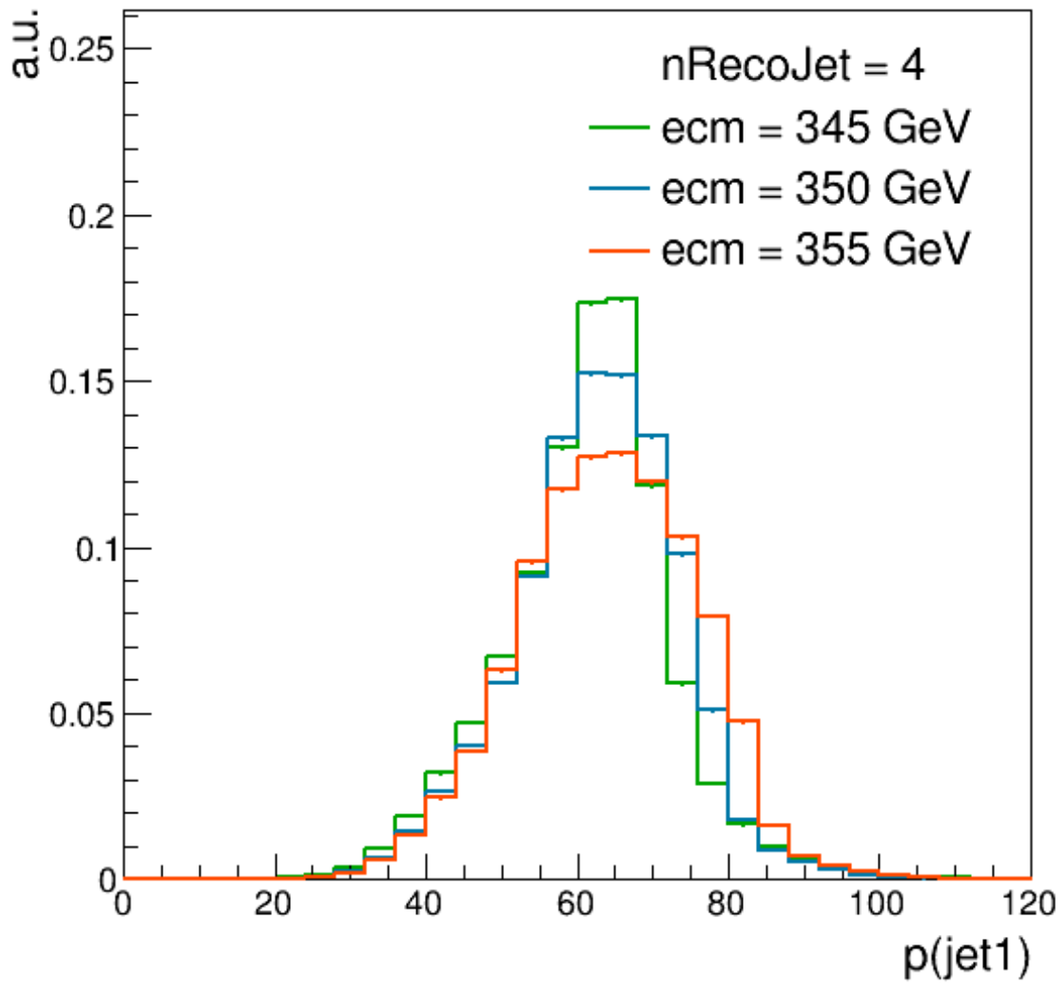


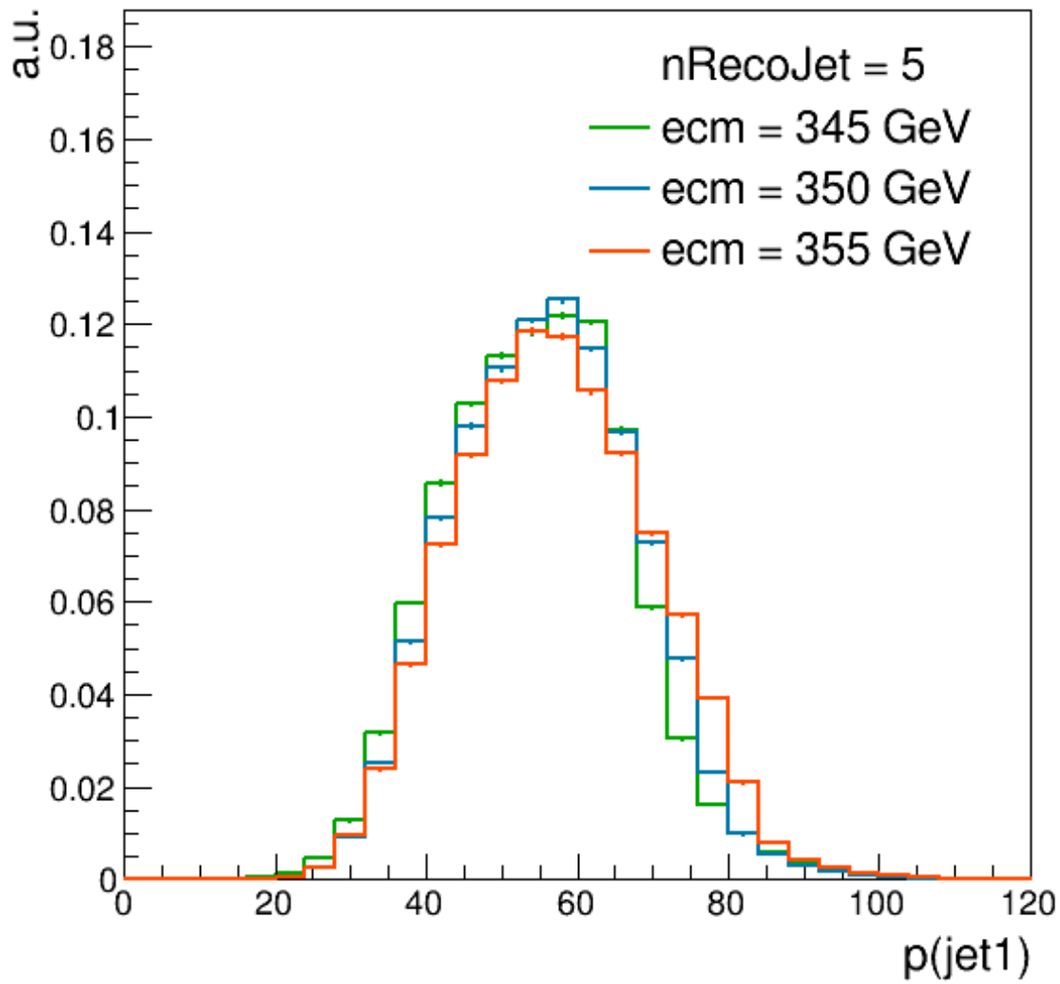


- Slightly harder lepton p spectrum at higher ecm as expected

Ecm dependence of p(j)

- At least one isolated lepton with p > 20 and njet =4/5

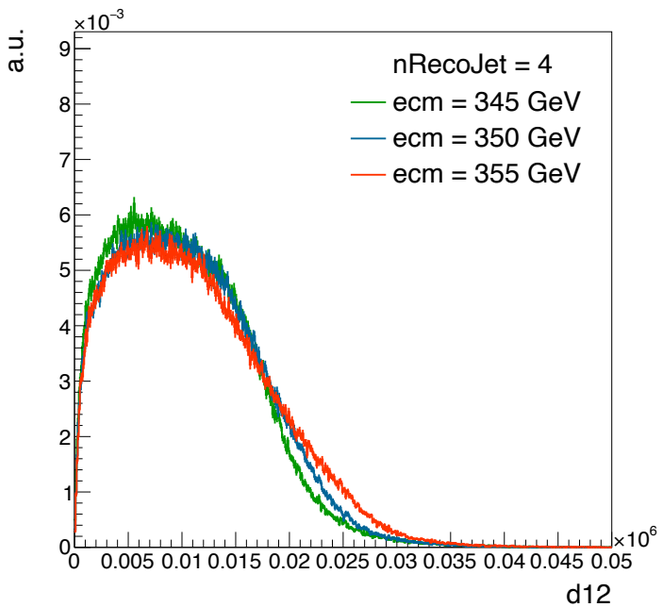


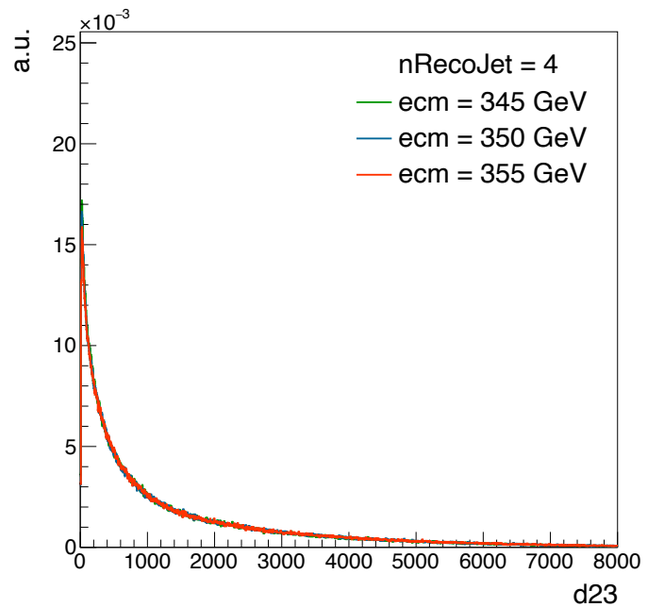


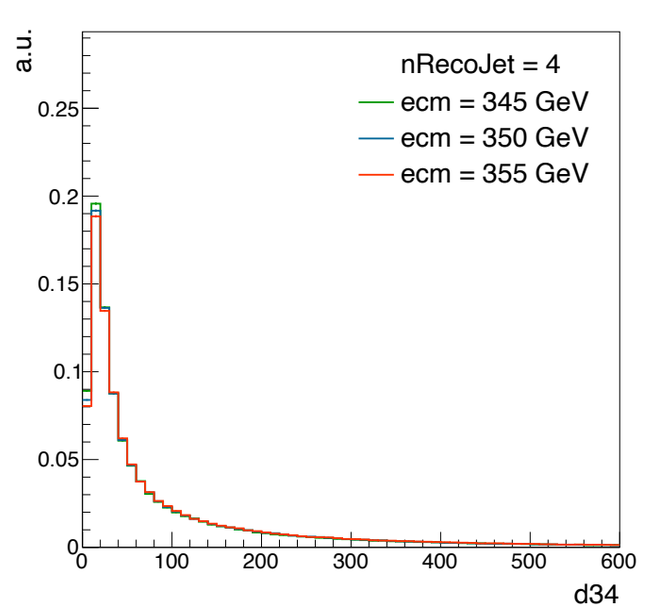
- Seems like gluon radiation is not negligible at higher ecm (gluon clustered together with one of the quarks)
- Should take this into account in reco-level selection

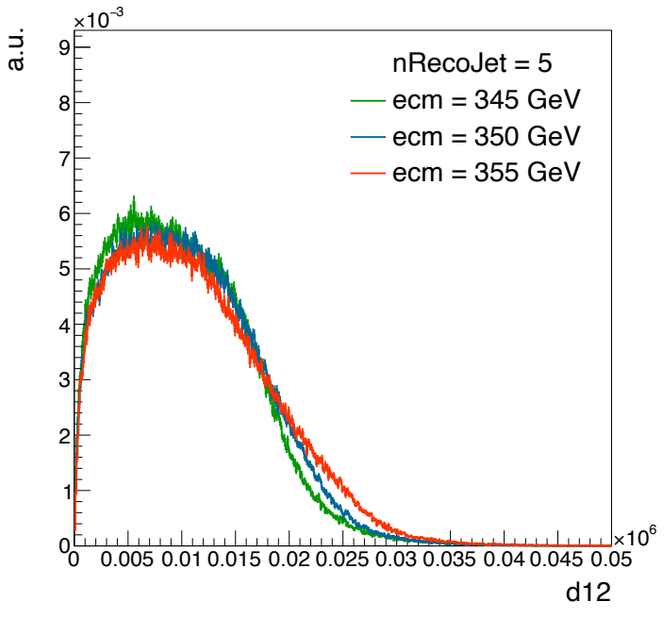
Reco level: d_ij variable

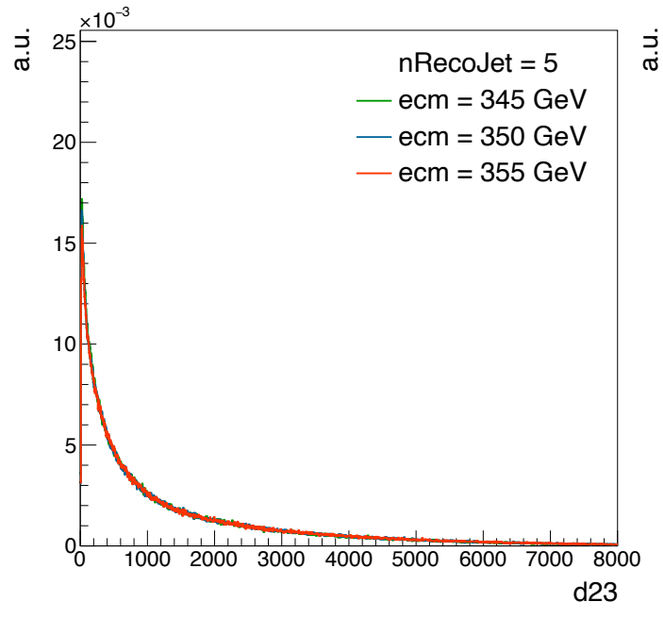
- At least one isolated lepton with p > 20 and njet =4/5

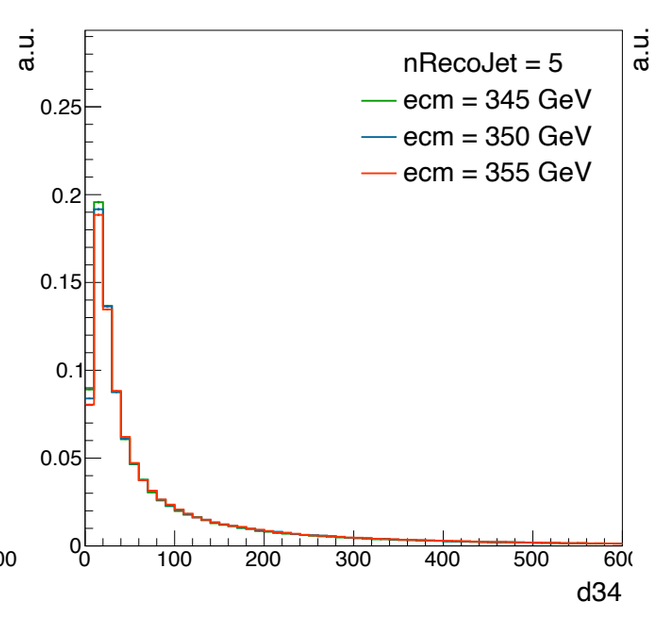


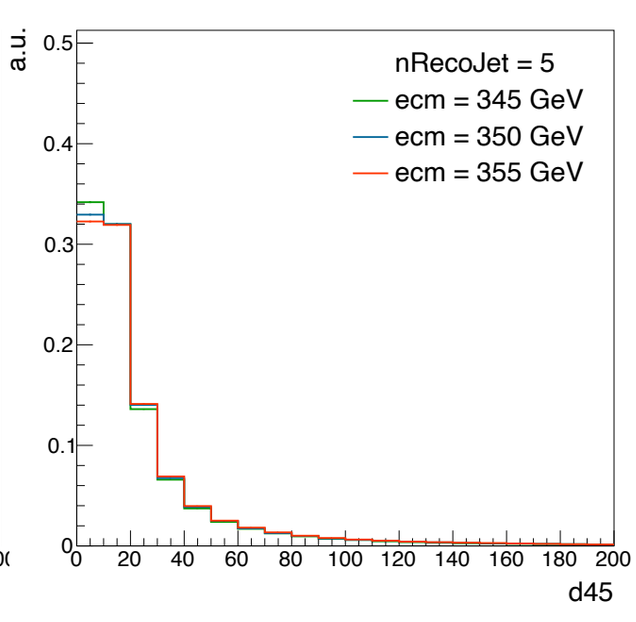






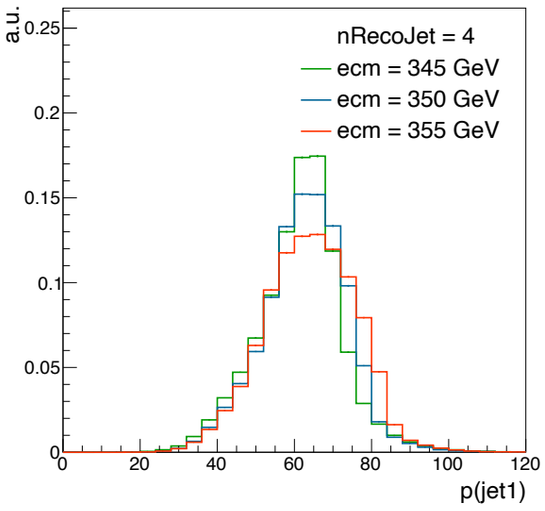


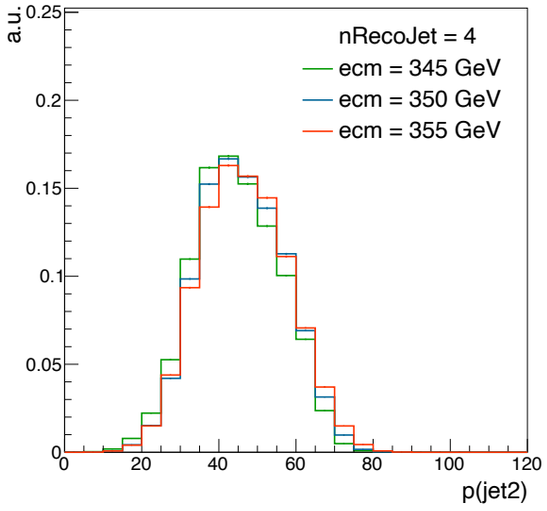


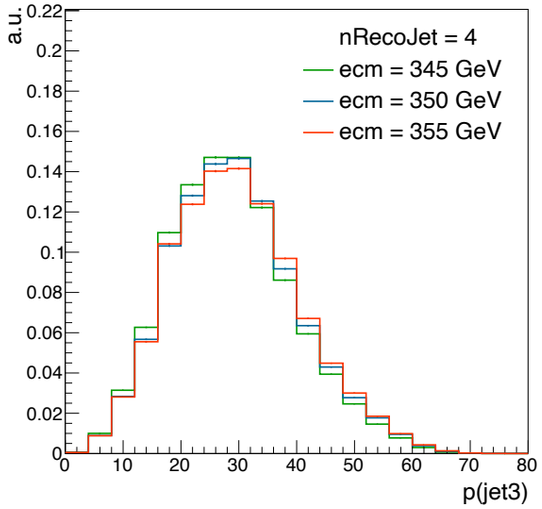


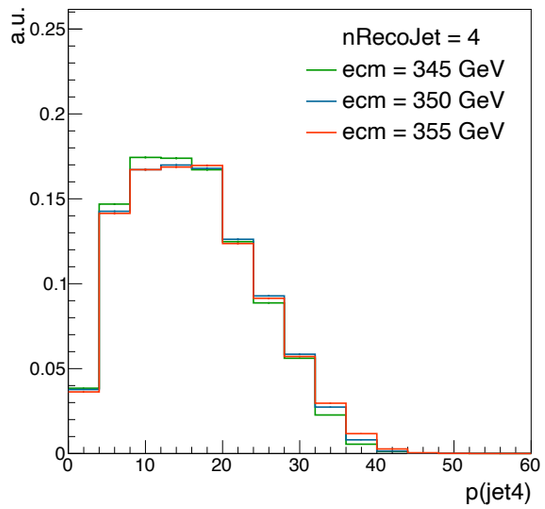
Reco level: jet momentum

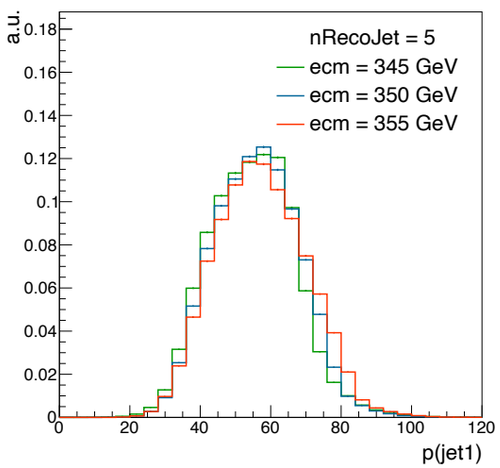
- At least one isolated lepton with p > 20 and njet =4/5

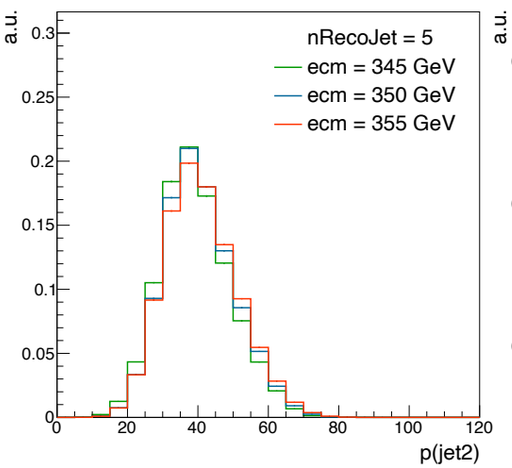


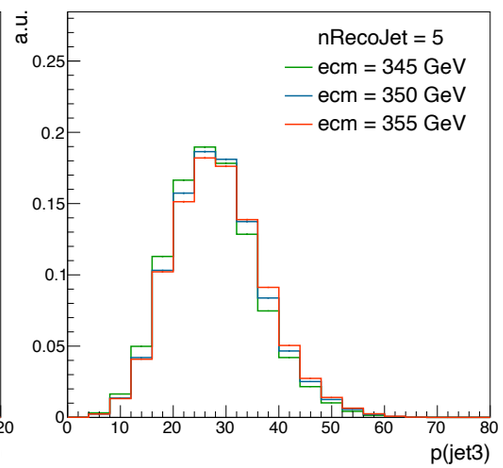


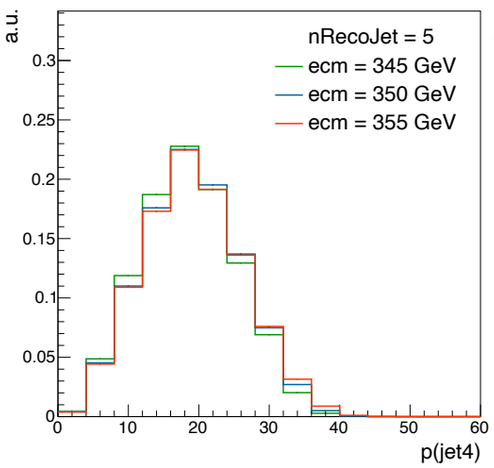


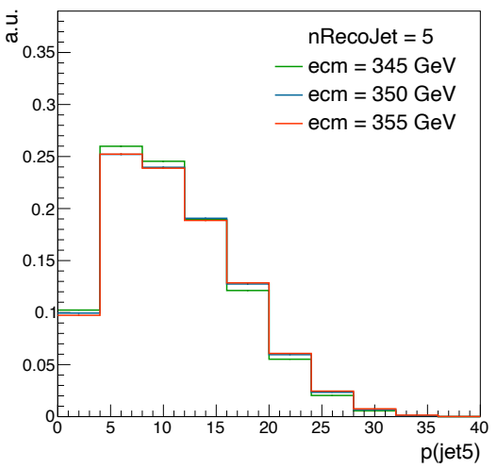












Summary and outlook

- Everything looks as expected at first glance
- Unclear what to do with status = 2 particles (see Zohre's slides)

- Will look into reco-level selection (including backgrounds)
- Extend study to fully hadronic final state

We have samples for
ecm = 345, 350, 355 GeV
generated with 2*mt = 345 GeV

Shall we also request a 340 GeV sample to check what happens below the production threshold?