Overall planning

(part of it is driven by Benjamin phd, manuscript should be handle by March2024)

Overall analysis strategy SS

What is missing?

→ Would like to use data as overall background (no systematics on MC background, no need to have large statistics of MC background)

➔ building falling spectrum thanks to 'Get Quantiles' method but the main issue is that the signal is getting spread on ST variable (before falling, looks like signal was in 4-5 bins, now much larger)

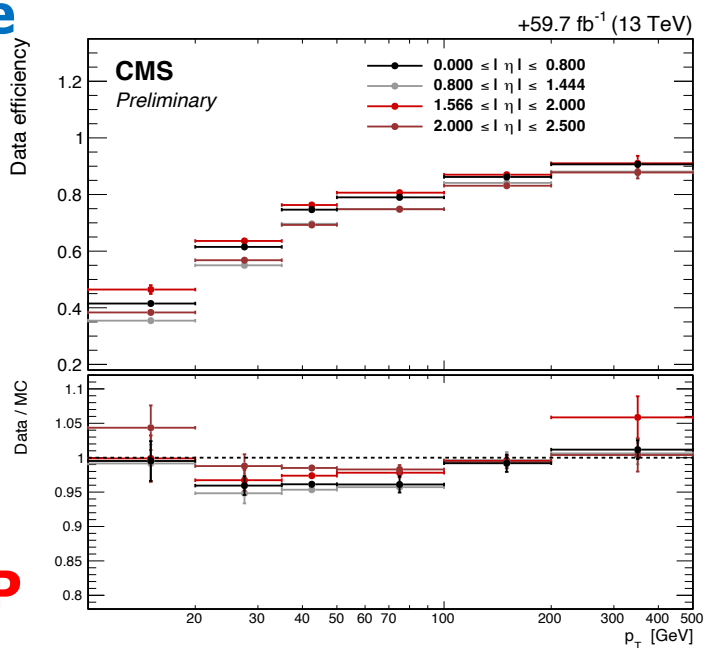
➔ Not easy to fit as signal is everywhere → possibility to use CR rather than fit (again CR in data so no systematics on MC background), try to see also a global variable

➔ Hope to converge on that within 2 to 3 weeks

→ In parallel, start Data Vs MC: from other phD students in IP2I, agreement should be already better than 10% (single lepton with missing QCD)

→ Framework is still missing lepton SF, but should be an effect of a few percent (below 5%)for electrons in 2018UL)

➔ SS analysis does not need leptons SF ASAP



Overall analysis strategy ssIP2I

What is missing?

→ Over April/May, start writing the AN (will help to cluster the infos, organise the work etc)

→ By ~June, finish the combine implementation:

➔ Main way: use CR to define ttbar (one or two depending on l+jets versus dilepton+jets) and ttbar+X (=W/Z/H)

→ In June, make sure AN is having all Objects used in order to start Object review (in B2G it is usually taking ~1 month), crucial to have trigger infos etc

→ June/July: Compute systematics, hopefully mainly from the signal + systematics on the CR (should be established at the time of CR definition), finish the writing of individual note.

→ End of July, established combination of channels IFF channels are correctly orthogonal (same framework, orthogonal criteria)

→ Review on going until ~September/October

if All goes well, paper by December → Talk for Moriond

(From July onward, Benjamin can concentrate on object part of his thesis)

For OS as I understand it

Concentrate on H→WW:
Mass Tidle → Nice clustering on the spectrum
Can we do bump into falling spectrum? → If yes, no systematics on MC, no need to work on data/MC agreement
Can we move the pick from background at 550 down to 500 with 'Get Quantiles' method? (move Cut1 only?)

Do we want to go with the standard MC background? Which precision on data/MC required (better than 2%, signal is tiny) →Could take long time

→ Until middle of April: work on other channels (ee,mu-e)
→ Ask for individual AN (objects should be the same in all AN, simply each phd could prove their individual work on CV)

For OS as I understand it

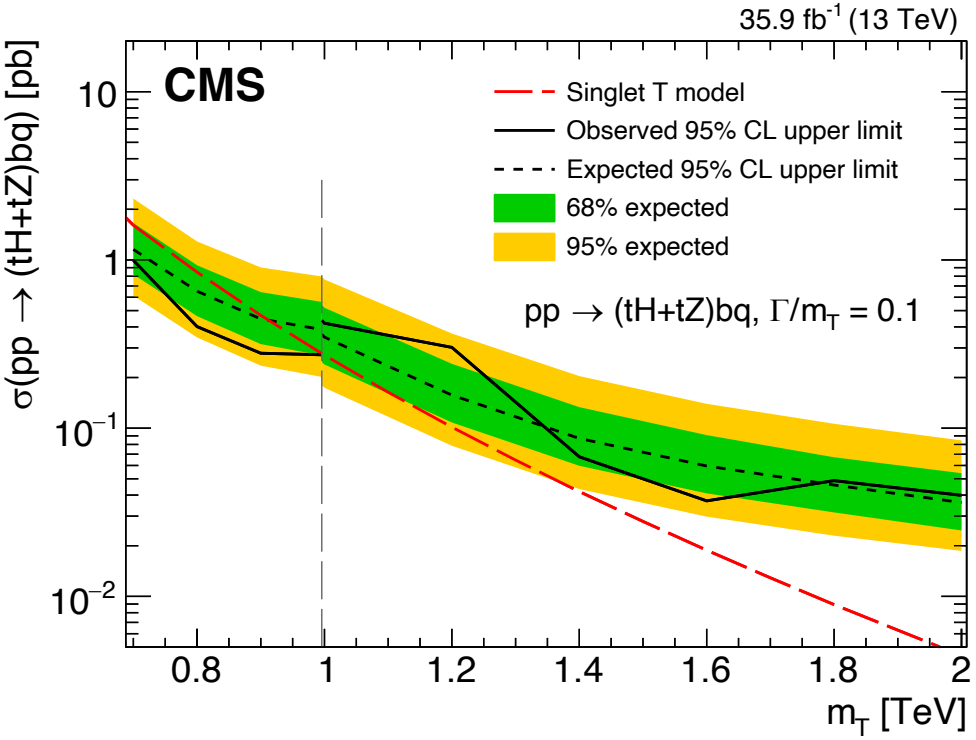
→ May, start DataVsMC and in parrellel start understanding Combine method (based on the choice)
→ June, have AN ready with objects and basic DataVsMC plots to start Object Review
→ Finish with combine strategy by end of June, adding systematics
→ End of July, move to combine results (additional AN)
→ Start review individual AN.

Full Hadronic with ML

Already a first version using only cuts that were in Cut Based AN
→ Need to understand why one cut is less efficiency in ML than in CutBased version
→ Tools to monitor the ML in place
→ April: poster for St Malo week
→ May, first basic version with training against ttbar MC
→ We could be training against QCD by replacing b-tagging values

→ See what are the updated performance…
➔ We would probably fit the output of ML → would be happy to have some expertise from DESY (a few hours)
➔ Individual note writing in May/June

Possibility to constraint larger widths



Single VLQ with width ~10%/20% or 30%

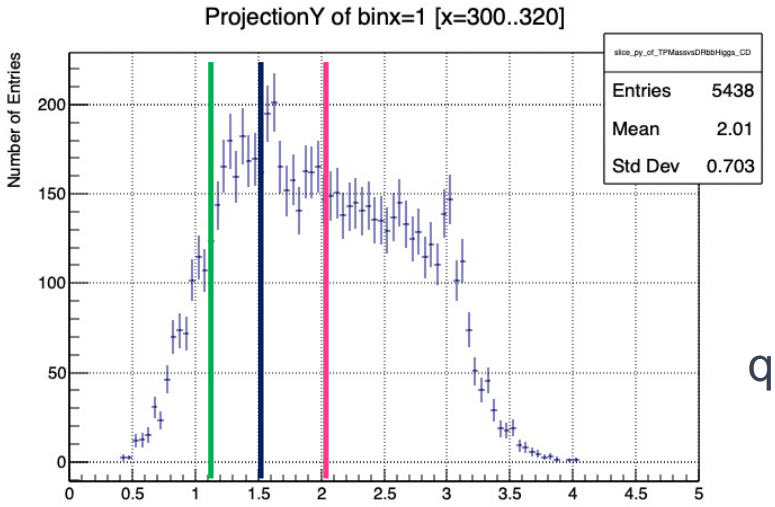
Production of MC samples should be launched soonish

Additional combination

Possibility to combine with T'→ top + H with H→ gammagamma mainly for large width…

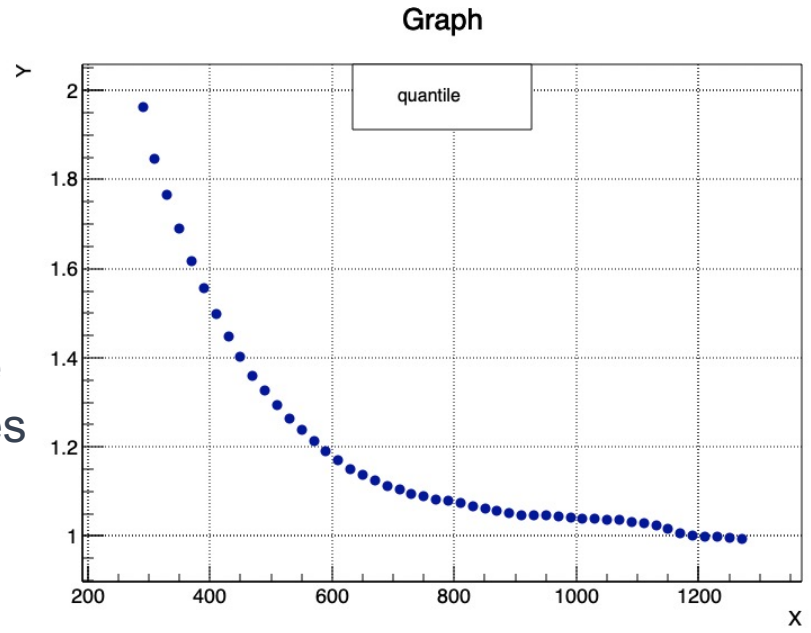
Paper can come only in September when individual AN are in review

GetQuantiles()



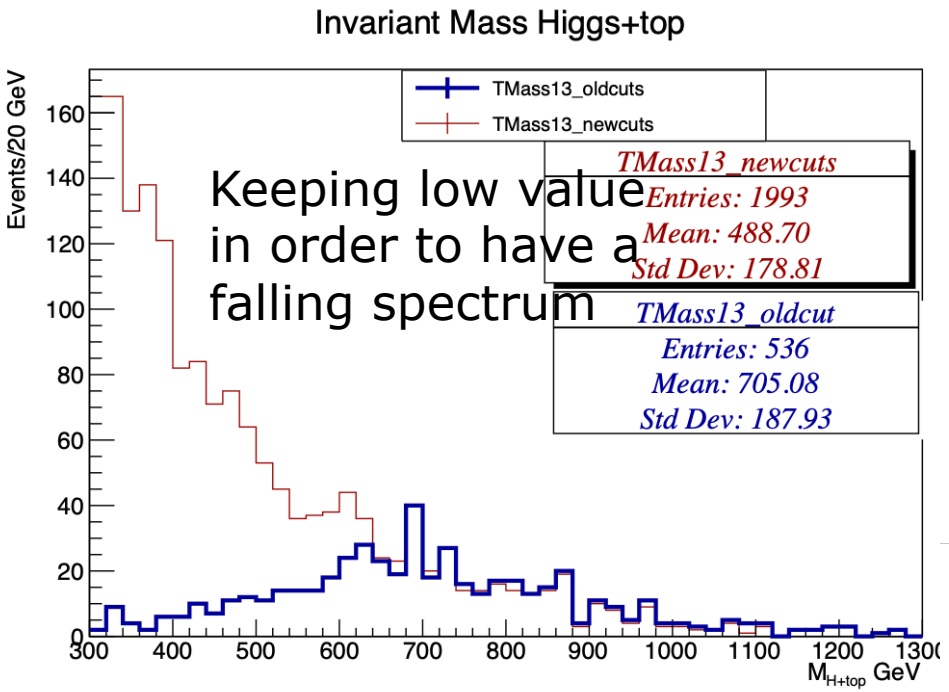
%50
%65
%70

→ derive the quantile values with with a specified percentage



→ Then fit to obtain a function as function of X, this function is the new cut value

GetQuantiles()



Keeping low value in order to have a falling spectrum