-- YanwenLiu - 2018-02-12

Emmanuel.

l49 "B-layber" --> b in math mode l59 line numbers missing (you need to put space before and after equation in the latex source code, for the lineno package l89 (end of) caligraphic L for the luminosity l103 reove space after [19, 20]

l115 and 116: I don't understand what is the phase space corresponding to these cross sections (It's not mension in the text ?). I would suggest to then remove them, because these numbers are not used after. Also the 2 sentences l114 - l117 "The main background ... siginficant ETmiss" are also dscussed in sec. 6. So UI would suggest to remove them here.

l117 "For the estimation of ... 0.5 are used" --> said in l352 - 354, so I sugegst to remove this here.

l119 suggest "The MC samples used to simulate ttH, ttV, VV and tt processes are described in Refs."

l143 should cite a public ref. for the electron ID working points definitions (loose and tight)

l143 removes space before 95%

l147 - 151. I suggest to put that paragraph before the description of the isolation requirement, and remove "Further background reduction is achived by using"

l155 Loose and tight in italics, as in line 142

l159 tight and loose in italics. removes quotes around T and L (or at least used latex english quotes `` ")

l160 removes space before "The signal search is"

l164 anti-kT --> anti-ktkt (in the name of the algorithm, it's a lower case t, see the paper.). put refs. [41, 42] after anti-kt (they refer to the algorithm)

l167 "Jest originating (...) b-quarks (b-tagged) are identified via a multivariate ..."

table 2: I don't find it useful to the reader. All numbers are already in the text and the table just says that T is tight and L loose. I suggest to remove it

l172 - 173 suggest "Reconstructed particle candidates (electrons, muons and jest) are defined in order to ensure a unique association to detector signals"

l175-176 "the momentum of all identified electrons, muons, jets and remaining unclustered"

l192 "required to be tight" ---> "required to be of type T" (?)

l194 "with increasing pT" --> "by increasing pT"

l205 "After this PREselection, 562 data events ..."

table 3, caption "Note that the leptons are ordered by decreasing pT ..." Ql is not explained in the caption or in the text the trigger requirement "at least one lepton with pTl > 30 GeV" needs to be explained in the main text. lines 4,5 column 1:space before l\eta_ll line 10 "N_b-jets = 0" --> bb in math mode

l213 is "QMisID" used later ? If not, remove it.

table 4, caption "The selection criteria defining the control samples used to determine ..." "for the 2lss and 3l channelS and the MC scale factor for the 4l channel" Meaning of "l1 or l2" or "l1 and l2" in 2 last lines of the table is not clear. Maybe to be explained in the caption ?

Also the table and the text are very confusing: differences between the 3 "fake enriched", "control sample", "background enriched" regions are unclear. Because the inverted ETmiss or Mll cuts are inverted only for the events used to determine the fake factor, and not for the events N^F_ll of eq. (6). But for N^F_ll we use only events with leptons of type L and not T.

The table is thus confusing, as well as the whole text 231 - 245

I suggest to simplify the description by defining only two control samples, with 2 clear names, like "background-enriched" of "control region" as used in the support note for the one used to get the N^F_ll, and "fake-enriched for the one used for the fake factor determination. The you specify that this secind sample is sub-divided into L and T leptons and T leptons to calculate the fake factors.

The meaning of \cancel{1} should be explained at the beginning of the section (after introduction of table 4?), because it's of general use in all the section and for the moment it's explanation is lost in the middle of the text.

before l245 missing line numbers

l251 "N^F_ll" are event yields in the background-enriched regions, and not "fake-enriched" regions

l256 "the charge misidentification HAS a negligible effect"

l259 "Equation (4)"

l263 suggest "uncertainties, resulting in total systematic uncertainties on the electron and muon fake factors of 55% and 81%, respectively."

l265 "fake-enriched regions" --> "background-enriched regions"

l266 "Equation (6)"

l271 suggest "two control samples labelled Z and T with three leptons and enriched in fake leptons originating from those two processes, respectively, are defined."

l277 in equation, subscripts, math mode for tt and Z of Z+jets

l291 "the other doubly-charged Higgs boson"

l292 "the jets originating from W bosons decays are ..."

l302 removes "It should be noted however that"

l303, end, suggest "lepton pair is close to the Z boson mass"

l308 "the following discriminating variables"

l318 removes "the" before ETmiss

l322 missing line numbers

l322++ "of the \phi ANGLES of leptons, ETmiss, ..."

equation 7, numerator: "*" --> \times or \cdot

l324 "The following discriminating variables"

l329 "The data ARE compared to the sum of the prompt lepton, fake lepton and ... lepton backgrounds predictions."

l330 "The expected signal distributions of various H++ masses ... illustrate the discriminating power of ..."

figure 2, and others: the standard ATLAS label is "\sqrt s = 13 TeV, 36.1 fb-1" (removes the "L =")

figure 2, caption line 3: "other prompt lLepton" --> "lepton" (typo) line 5: The expected signal distributions corresponding to TWO H++ masses ARE also shown, ..."

l348 "3.8% for THE 2lss, 3l and 4l channels" (?)

l354 Here we should mention the variations by factors of 0.5 --> merge with the text from l119

l359 Add values for the size of the "large uncertainties" --> "large uncertainties of XX% are assumed ..."

l385 "based on A likelihood ratio test"

l389 We maybe miss here a small sentence saying how we derive from the likelihood ratio test to the 95% CL limits.

Figure 5, correct lumi. label in the figures caption "The yields in the the signal regions optimised to mH++ = ... searches." the band is for the total uncertainty ? if yes, I suggest "the background uncertainty" --> "the total uncertainty on the SM background"

l397 "collisions at A center-of-mass energy of"

l407 removes space after "GeV"

Figure 6: correct lumi. label in the figure

CloseReplyReport abuse avatar tamara.vazquez.schroeder@cernNOSPAMPLEASE.ch 12 Feb 2018, 02:53 Dear authors,

Thanks for the new draft (v0.4). Please find some more comments below.

Cheers,

Tamara

=======

Abstract

L17: The search   > This search (since the previous sentence also starts with   The search)

Introduction

L35: following the number of light leptons

Phenomenology

L77: the main production mechanism of H++ at the LHC is

L87: higher background contribution

Data and Simulation

L102: since you are mentioning higher order corrections in L107, maybe it s worth to specify here the accuracy of the signal generator you are using.

L107-8: Higher order corrections increase these cross sections by a factor 1.25

L120-126: not sure all this is needed. It would be enough to say that background contributions with one fake/misidentified lepton are estimated using data-driven methods.

Event reconstruction

L133: are reconstructed using > are required to have

L144: isolation condition > isolation requirement? please change in all relevant places

L159-160: The type T conditions are a subset of the type L conditions (you have it swapped)

All leptons used in the > this sentence can be removed from here, since it will be introduced in a better way in the next subsection

Table 2 caption: Summary of electron and muon object definitions. L denotes Loose and T denotes Tight.

Table 2: "Lepton pT" and Identification and isolation rows are not very descriptive. The former, because then you apply tighter pT cuts to the tight leptons depending on the channel. And the former, because loose and tight does not really describe anything specific.

One more question here, apologies if I have asked it already before Are you sure you are applying a Loose isolation requirement on the L lepton? i.e. you are NOT using the ttH-ML channel flags dil_type, trilep_type, etc. based on L leptons without isolation, but you are using your own classification based on different ntuples?

Event preselection

L187: the preselection and the signal region selection/optimisation

L192-193: same as 161-163. Please keep only one instance of this.

L198: maybe add here the motivation for the deltaR ordering of the leptons in 3L channel?

Table 3: Mll SFOS

Background estimate

L209: non-prompt leptons are not really a mismeasurement , maybe write non-prompt and mismeasured leptons

L215: can confuse the track association > does not sound very accurate please rephrase

4

L218: large data samples

L223: remove text inside parentheses

[the line numbering at the beginning of page 13 is missing] The electron fake factor calculation needs

L246-247: remove   testing the robustness   method.

L257: that is inverted   > strictly speaking you are not inverting it, since you are not considering Nj=0. Please rephrase.

L262: can you please remind me why the uncertainty on the muon fake factor is considerably larger than for the electron?

L270: remove   with three leptons   since you already mentioned it before

Signal region optimisation

L309 and L313: Invariant   > invariant

L323-L326: This information is already included in the description of the variables. Maybe remove this information from the description of the variables, and keep this?

L329: background prediction.

L334: are optimised separately: ee, emu, and mumu channels; in the

L340: discrimination power does not

Table 5 caption: signal regions. The variables are described in Section 6.

Figure 2 caption: the other prompt lepton ;   the distributions expected from the signal corresponding   ,   the total uncertainty on the SM prediction

Systematic uncertainties

L377:   correlated uncertainties amongst the various signal regions   > except for the DD uncertainties, right? Please clarify

Results

L384: on the likelihood ratio test

L386: the likelihood function is

L388: implemented in the likelihood functions with Gaussian constraints (?)

L390: channels

Figure 5: wouldn t it be better to plot the H++ signal on top of the background, as part of the stack plot?

Figure 6 caption: The region above the dotted line is excluded by the measurement   > not sure how to interpret this; the dotted line is the expected upper limit, right?

Conclusion

L398: This analysis is the first..

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This topic: Sandbox > HppWpWpCommentsV4
Topic revision: r1 - 2018-02-12 - YanwenLiu