



same-sign di-lepton + b-jets new physics searches with CMS

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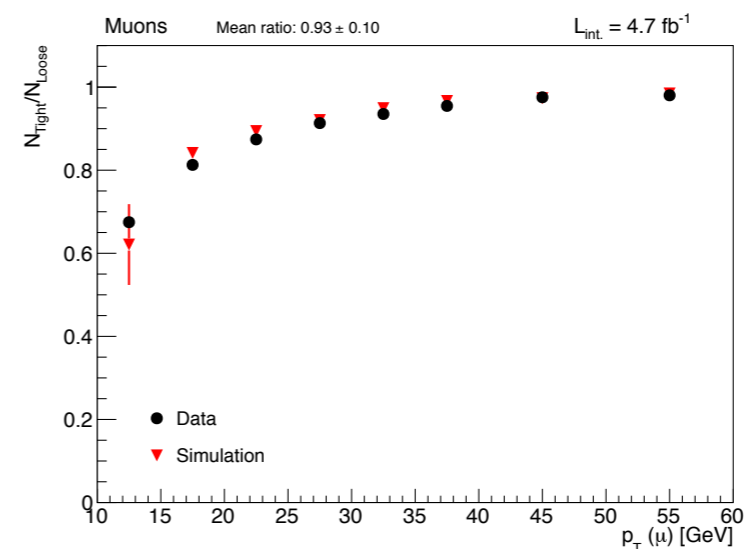
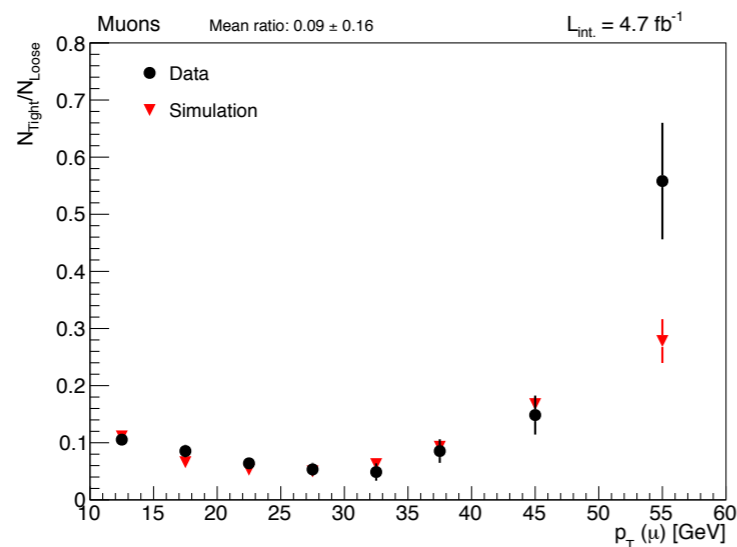
recap of the method

idea:

deduce number of 'real' prompt (W, Z, SUSY) lepton (e, μ) pairs by measuring fake and prompt ratios in data

$$\begin{aligned}
 N &= N_{pp} + N_{pf} + N_{ff} = N_{tt} + N_{tl} + N_{ll} \\
 N_{ll} &= (1-p)^2 N_{pp} + (1-p)(1-f)N_{pf} + (1-f)^2 N_{ff} \\
 N_{tl} &= 2p(1-p)N_{pp} + [f(1-p) + p(1-f)] N_{pf} + 2f(1-f)N_{ff} \\
 N_{tt} &= p^2 N_{pp} + pf N_{pf} + f^2 N_{ff}
 \end{aligned}$$

Work in progress





extension to b-tagged jets

idea:

keep the data-driven fake-ratio method

extend the 'classical' same-sign searches (see Benjamin's talk)

b-jets:

large reduction of SM background processes while retaining sensitivity towards new physics models

extension to b-tagged jets

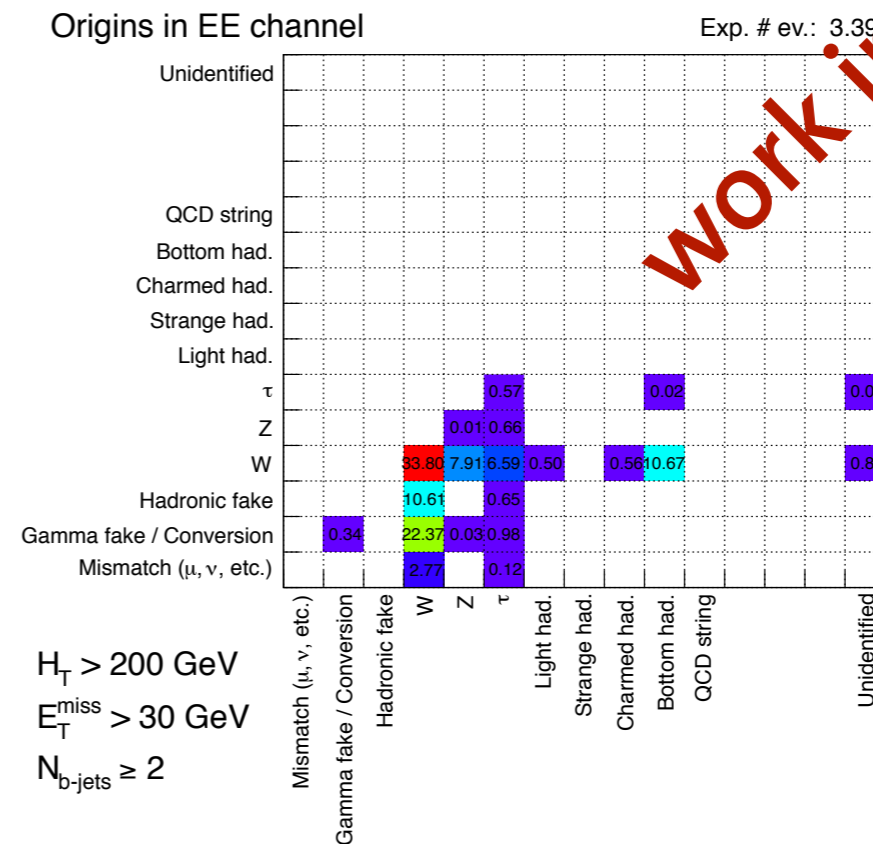
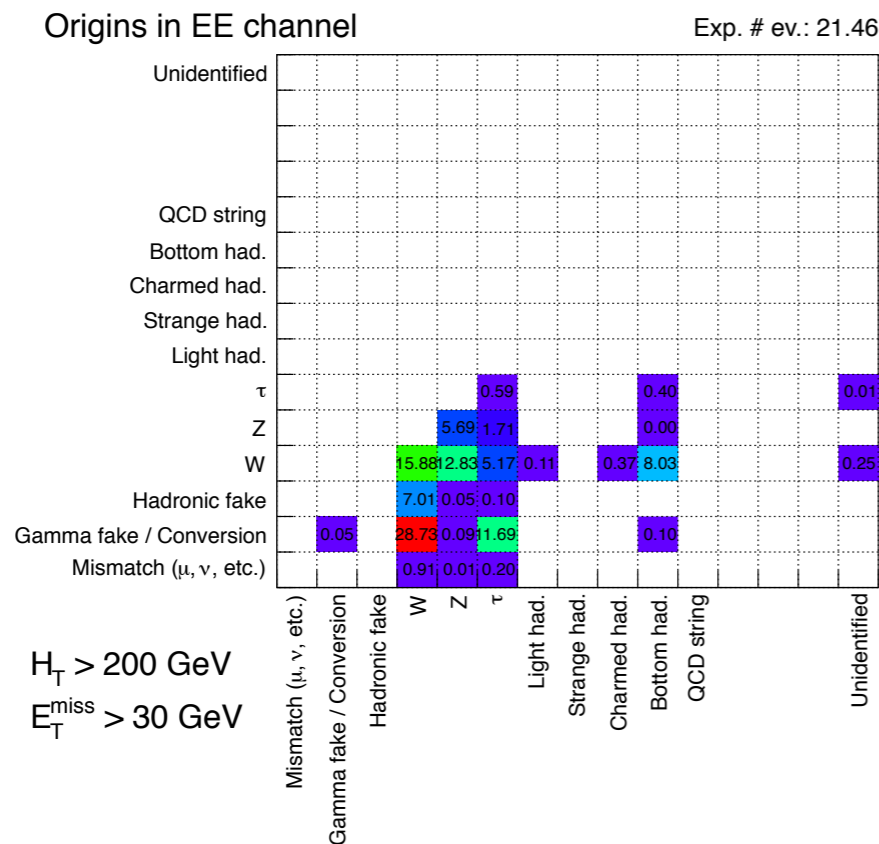
questions:

how does the background composition change?

--> essentially only tt and rare processes left

--> rare processes: WW, WZ, ttW, ttZ etc.

Work in progress



extension to b-tagged jets

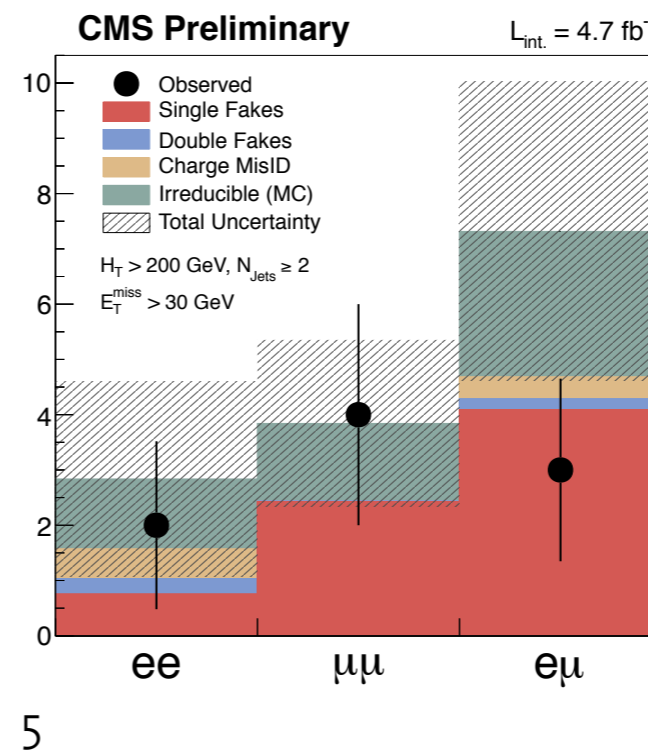
problem(s):

‘real’ non-prompt leptons from heavy flavor decays are inherently reduced (cleaned)

gamma conversions are virtually not affected by b-tags
--> relative enrichment of conversions (ee)

(very) preliminary results:

Work in progress





my (future) contributions

--> extend (improve) the method

--> CMS pixel online software (service) work

--> possibly get involved in pixel upgrade