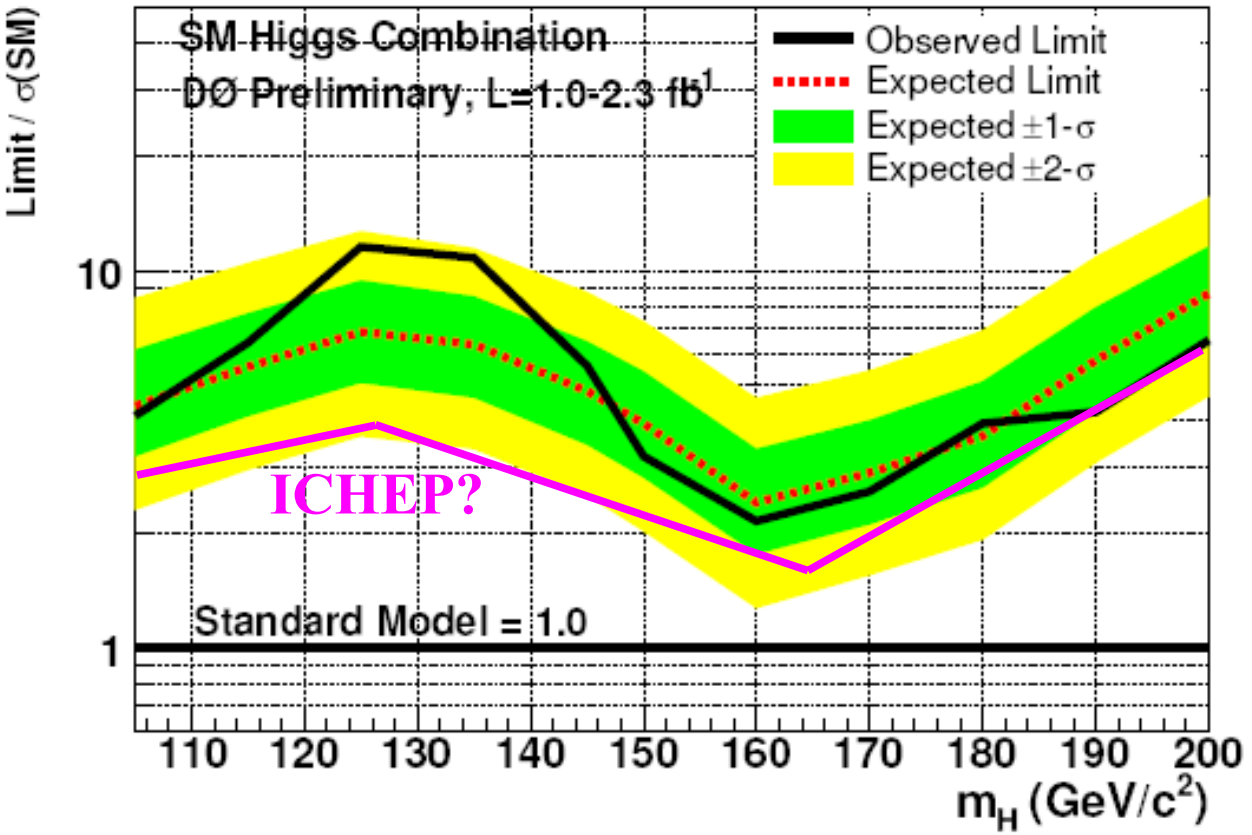
Higgs Update for ICHEP 2008

Andy/Gavin/Sasha

DØ Convener's Meeting
June 20, 2008



WH -> l nu b b

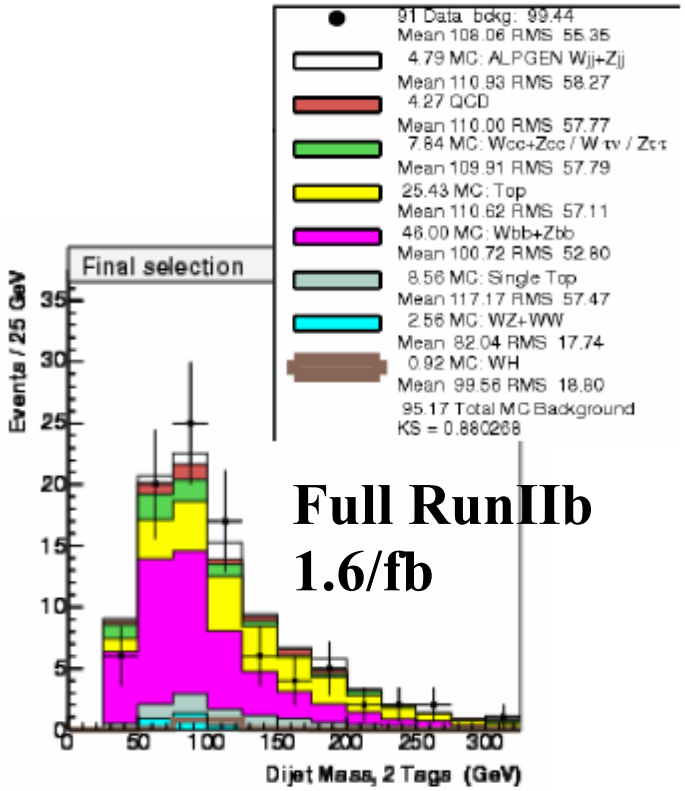
p17 publication in EB review
- 20% better than LP'07 (3 jet, EC, etc.)

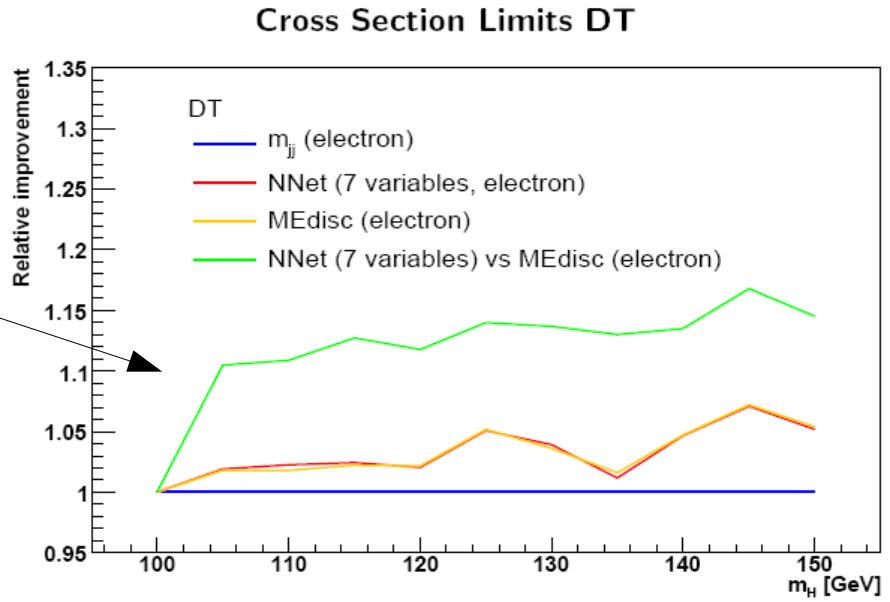
Much learned during p17 review
- shape systematics, triggers, QCD determination, k-factors, MC@NLO, ...

For ICHEP, similar to p17, more data: (2.6/fb), NN+ME combined

Studying combination of NN+ME
- will train NN with ME input

On hold: new EM-ID, JER (tried it!)

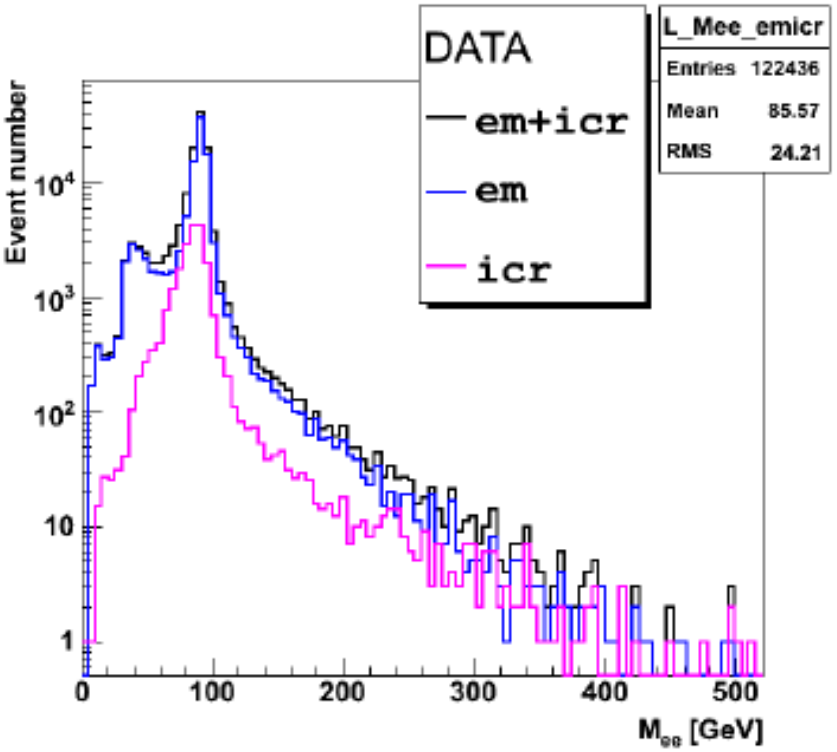




ZH -> l l b b

p17+p20 (2.3/fb) NN preliminary for ICHEP in EB review
- Have progressed significantly on systematics
- May still add in 0.4/fb of post-shutdown data...

3.5/fb for winter
- Reanalyzed p17
- New EM-id
- ICR electrons
- Mu+track
- Mass resolution improvements
- NN w/ ME input
- muonic b-tagging?



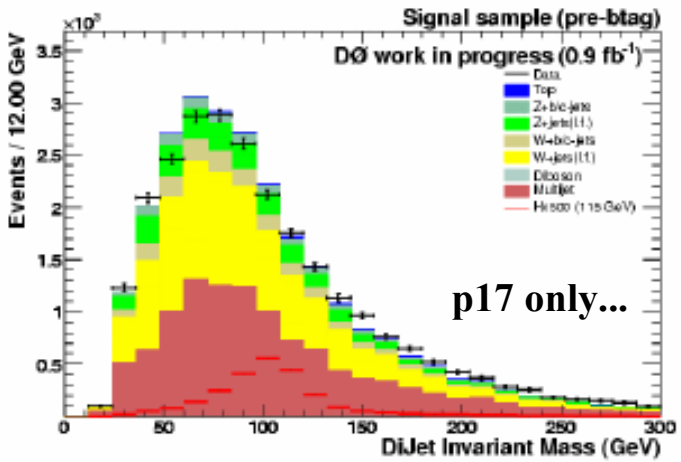
17% additional Z's from ICR + CC/EC
?% additional from new EM-ID

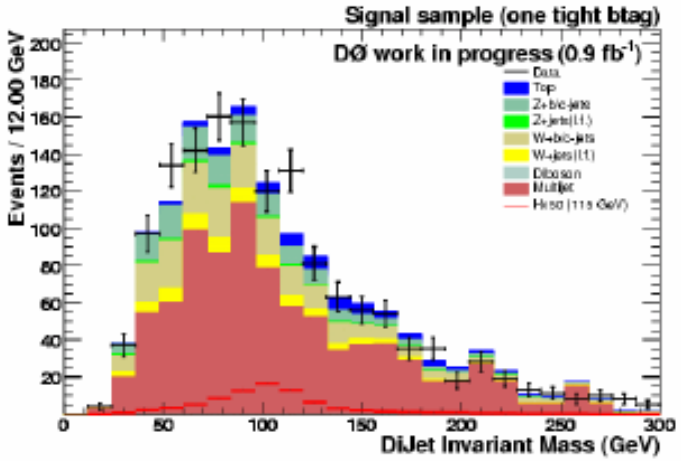
ZH -> nu nu b b

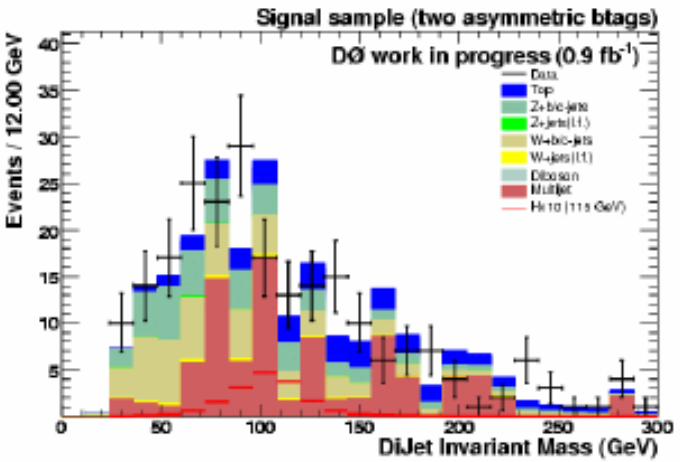
p17 PRL in EB review

Full p17+p20 (2.6/fb) dataset, publication quality for summer

- Improved trigger parameterizations
- Better QCD understanding / looser cuts (MET>40 GeV!)
- Single-tag channel
- New MET variable (ala ZZ->nunull)
- Separate ZH / WH using isolated tracks?







H->WW-> l nu l nu

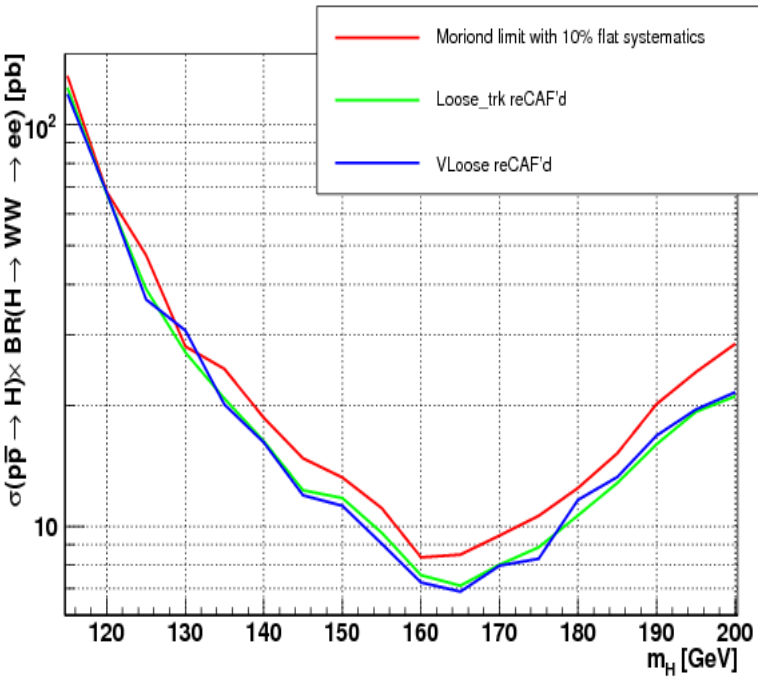
<u>May exclude m_H=160 at ICHEP!</u> (w/ CDF)

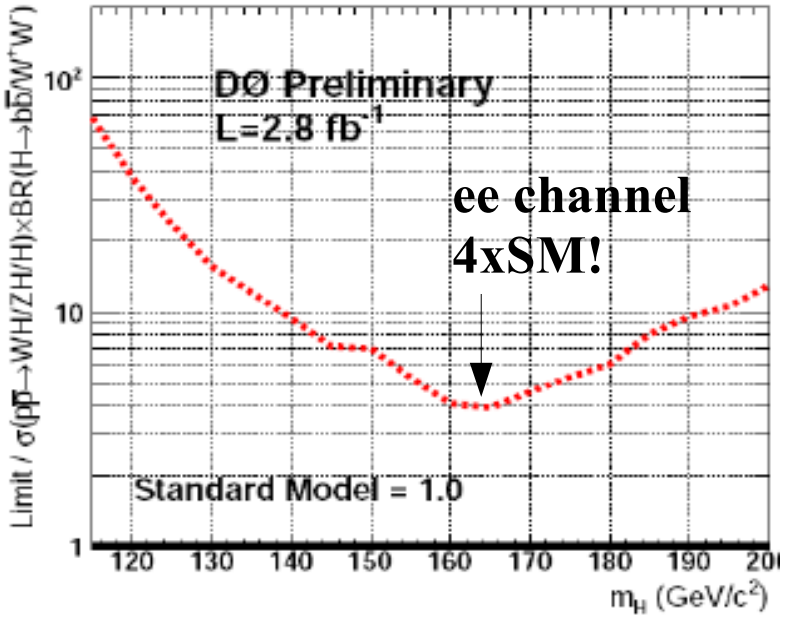
Full dataset (2.7/fb so far...
may add in more last-minute data)

- Greatly improved NN
- Re-analyzed p17
- Looser cuts
- W+j/gamma ME?
- Better systematics (MC@NLO/Sherpa, W+jets, complete shape systematics)
  - D0/CDF H->WW systematics meetings
- New EM-id / re-caffed track-match

On hold:

- ICR electrons
- Optimized 2-jet bin analysis for VBF, W/Z(->jj)+H(->WW)



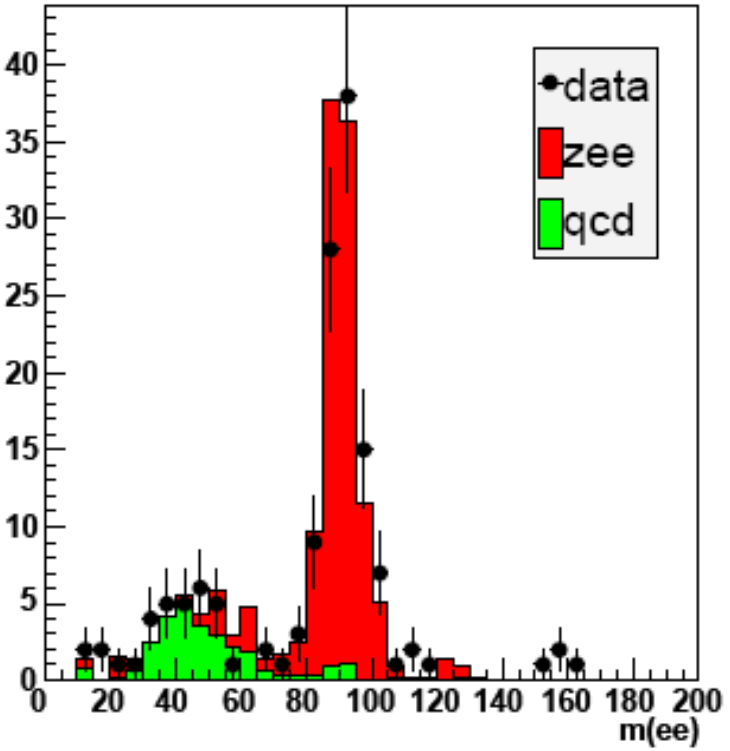


WH->WWW -> l+ l+

p20 preliminary for ICHEP, 1.6/fb
- luminosity understood to 10%
- good agreement between data/MC
- can use EC electrons

Improvements vs. p17:
- include like-sign and tri-lepton channels
- include all signal channels (WWW/WZZ/ZWW/ZZZ) with 5 GeV mH grid
- replace likelihood with NN
- looser lepton cuts
- better QCD modeling

On hold:
- new EMid



bh->bbb

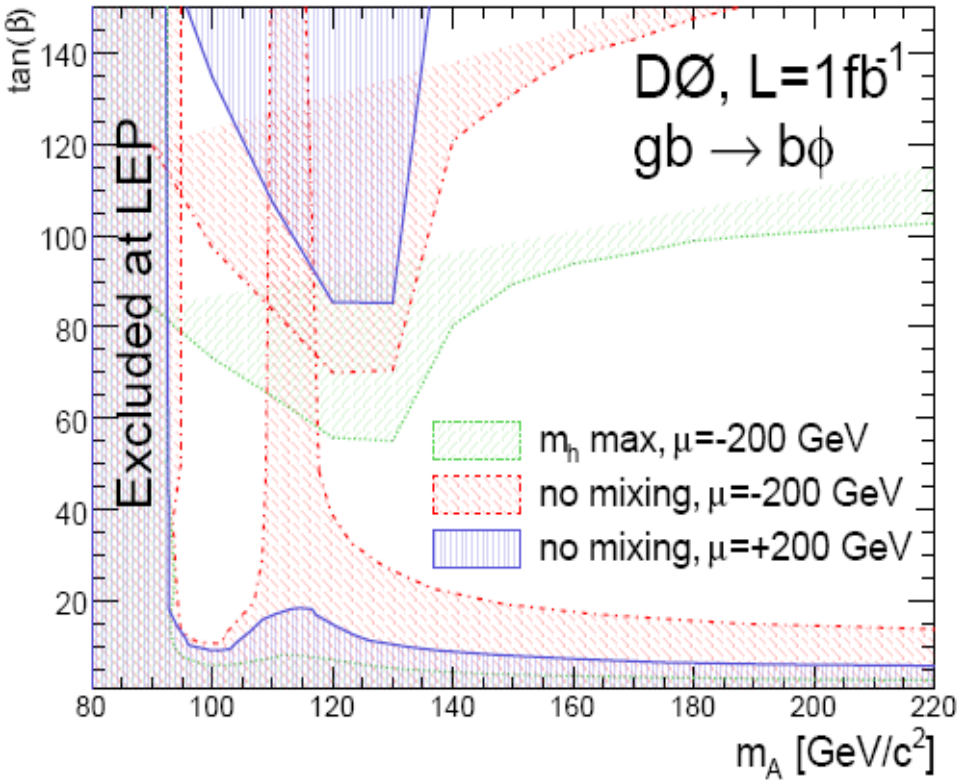
p17 PRL approved!

p20 data studied using p17 method and alternate approach

Will combine with p17 for ICHEP

Improvements will be in publication (to follow soon after):

- NN
- other triggers (mu)
- jet pairing optimizations
- mass resolution



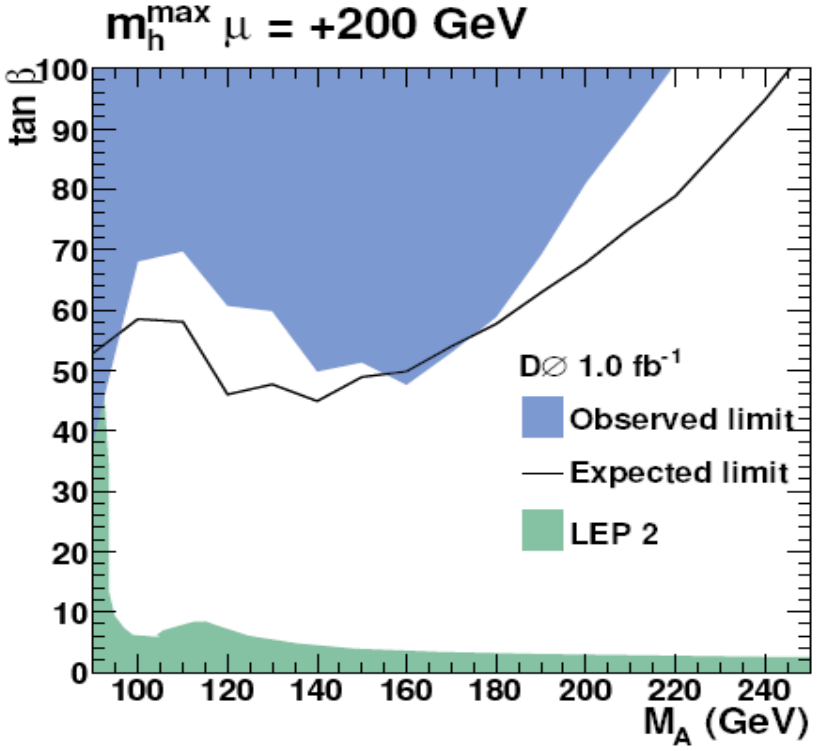
h-> tau tau

p17 PRL approved!

p20 for ICHEP:
- Focused on mu+tau and M_{vis}
- Single-mu OR

Then work on:
- e+tau
- NN
- mu+tau triggers

p20 e+mu also available for ICHEP?



bh-> b tau tau

p14 PRL nearly submitted – first TeV publication in this channel!

mu+tau:

p17: working to become more uniform with new p20 analysis

p20: basically ready
- Have alternate methods for estimating QCD
- New likelihood to reduce QCD, combine with anti-top KNN
- Adding new triggers

Combine p17+p20 for ICHEP

e+tau:

p20: at earlier stage, following mu+tau p20 approach

Other

W+W/Z->lnujj: p17 publication in EB review, converging.

H->WW->lnujj: Progressing. p17+p20 for ICHEP. ~15x SM?

VBF: Result for ICHEP using Sherpa reweighting?

H->gg: p17+p20 (2.3/fb) for Moriond'08
- Improved, should be ready for ICHEP (2.7/fb), ~30x SM!
  - Hits on road
  - Add VBF and W/Z+H signals (may optimize analyses for them)

p20 H->WW->mu+tau (1.6/fb) for ICHEP? Combine with p17?

WH-> taunubb: p17 for ICHEP – in group review!

ZH-> tautaujj(bb): p17 for ICHEP?