

missing reconstruction/ analysis tools

Junping Tian (KEK)

High Level Reconstruction Workshop, July 6-10, 2015 @ DESY

get the data

make the data useful

extract the physics

detector

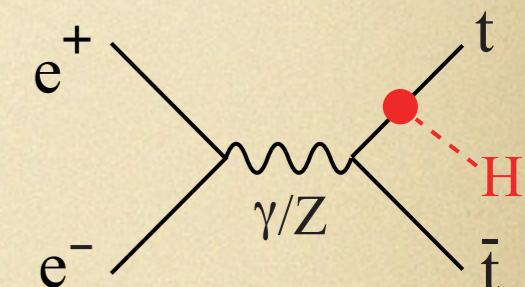
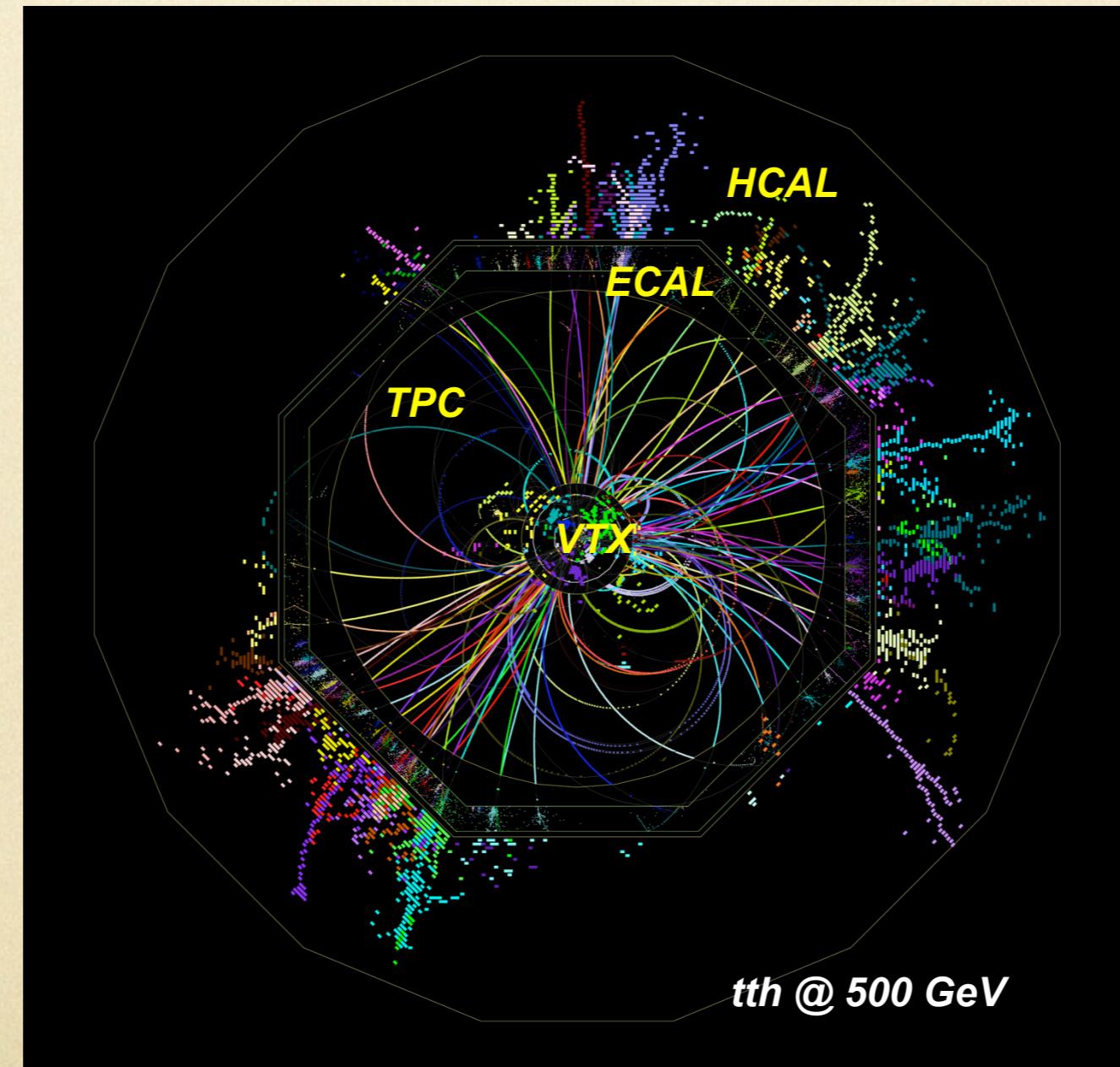
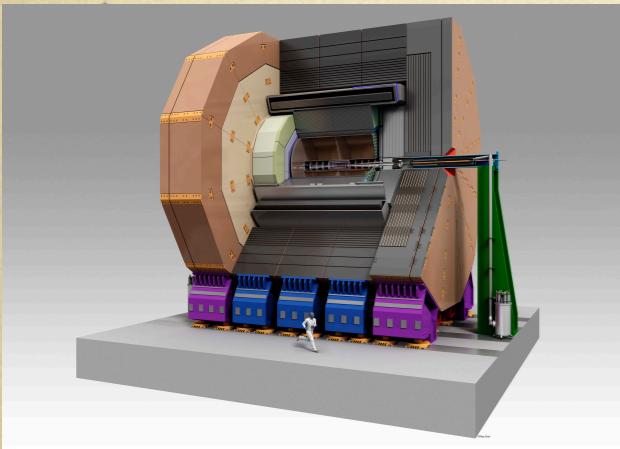
reconstruction

analysis

better design

more sophisticated tools

better measurement



High-Level Reconstruction

J.List

- **Particle ID**
 - photon reco
 - pi0 reco
 - tau reco
 - **dE/dx**
 - **cluster shape**
 - isolated leptons
 - **V0s**
- **FlavourTag**
 - life time
 - **leptons in jets**
 - **vertex charge**
 - vertex mass
- **MarlinKinfit**
 - **b jet treatment**
 - vertex fitting
- **JetFinding**
 - Marcel's JetFinder
 - vertex-based jetfinding
 - **ColorSingletJetFinder?**
- **BeamCalReco**
 - new parametrisation?
- **PFO uncertainties**
 - **p covariance matrix**
 - **jet by jet energy uncertainty**
- Truth information
 - RecoMCTruthLink
 - TruthVertexFinder
 - TruthColorSingletFinder
- **MatrixElements**
 - interface Helas / Omega

A lot has happened
since the DBD – but
mostly in the context of
individual analyses!

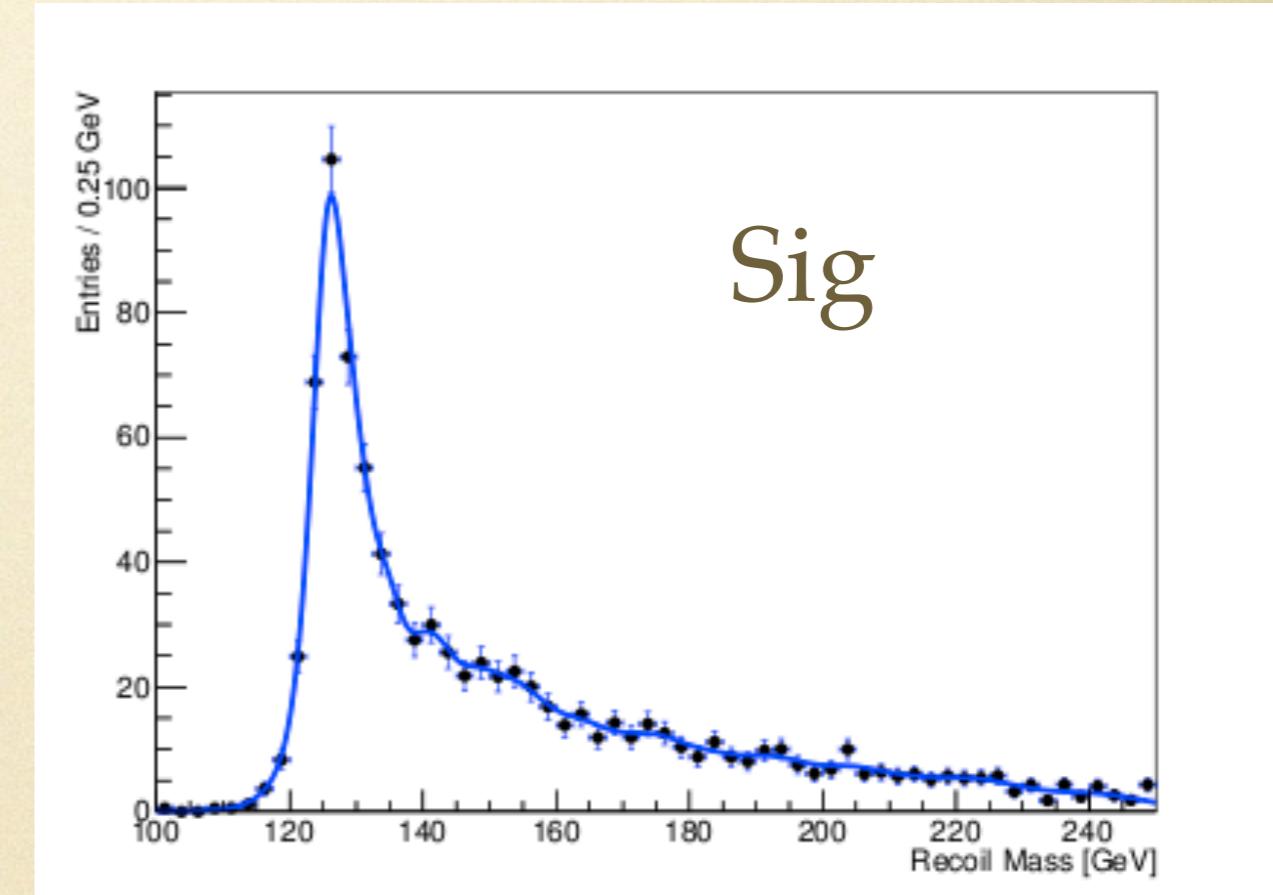
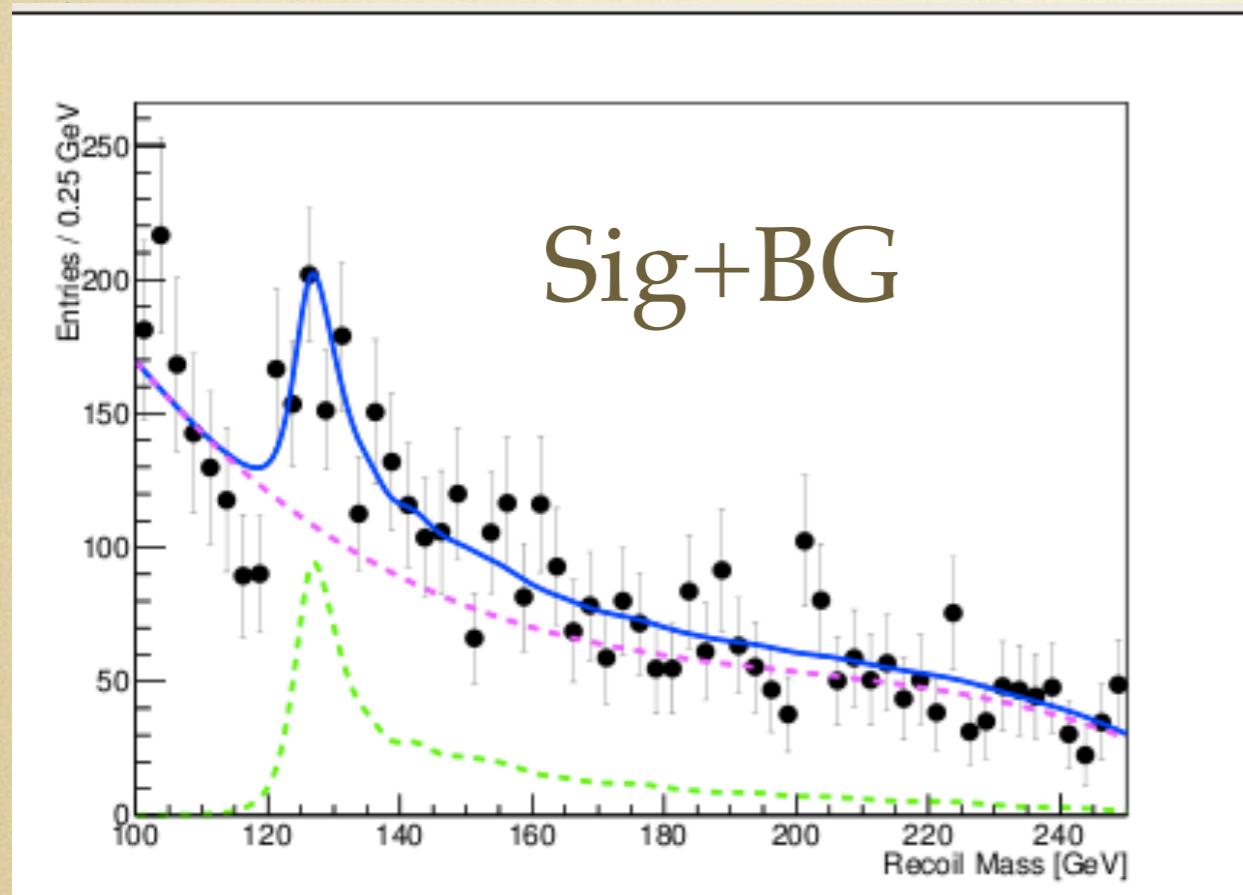
few missing tools from analysis point of view

- PID:
 - ▶ combined ECal+HCal shower profile
 - ▶ combined track + shower fit
- Photon:
 - ▶ bremsstrahlung / FSR tagging
 - ▶ ISR tagging (in-detector)
 - ▶ ISR/beamstrahlung recovery (in-beam) by KinFit
 - ▶ photon split/conversion (e.g. improve $H \rightarrow \gamma\gamma$)
- Neutrino:
 - ▶ kinematic rec. of $\tau \rightarrow \nu X$
 - ▶ recovery in b-jet/c-jet: crucial for H and W mass
- Beam overlay:
 - ▶ reconstruct the shifted overlay vertex
- New jet clustering & Matrix element method

impact of BS/ISR/FSR in recoil mass

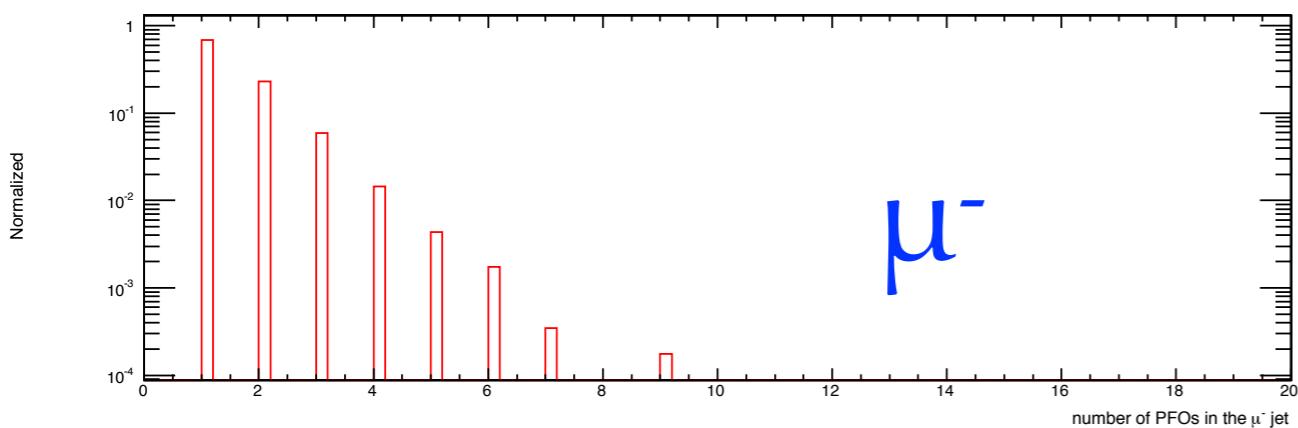
$e^+e^- \rightarrow \mu\mu X$ @ 500 GeV

J. Yan

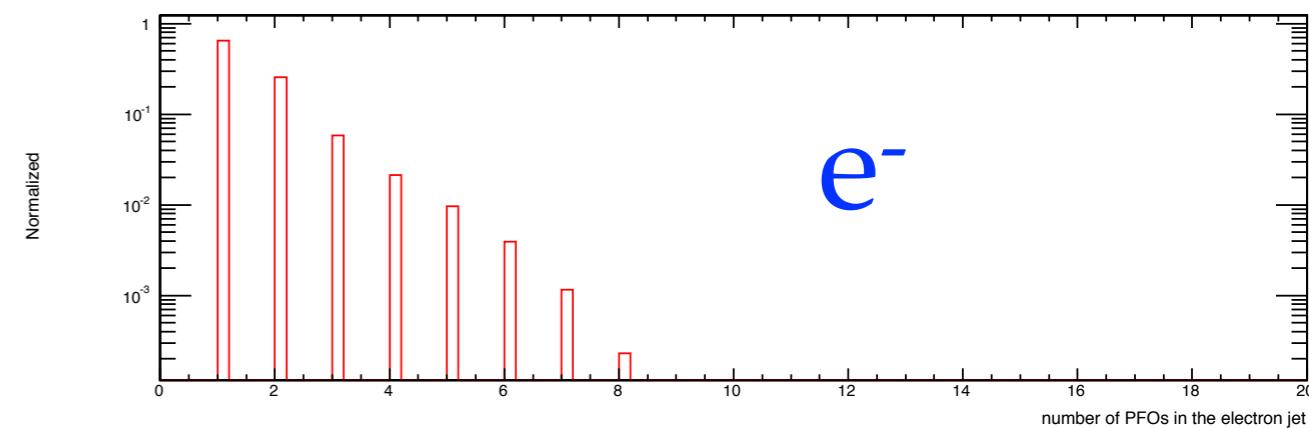


number of PFOs in a charged lepton jet (from cheated jet clustering)

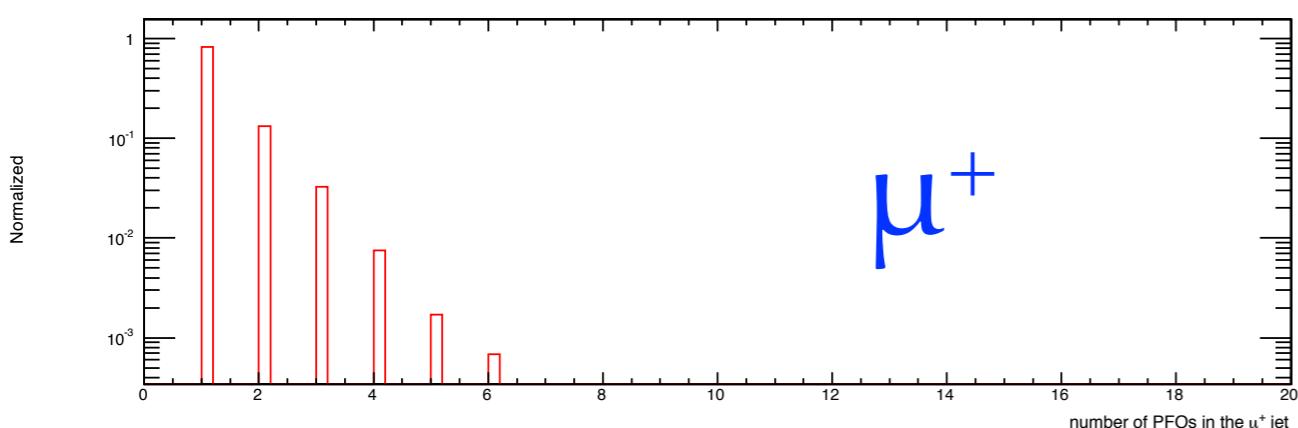
$\mu\mu HH$



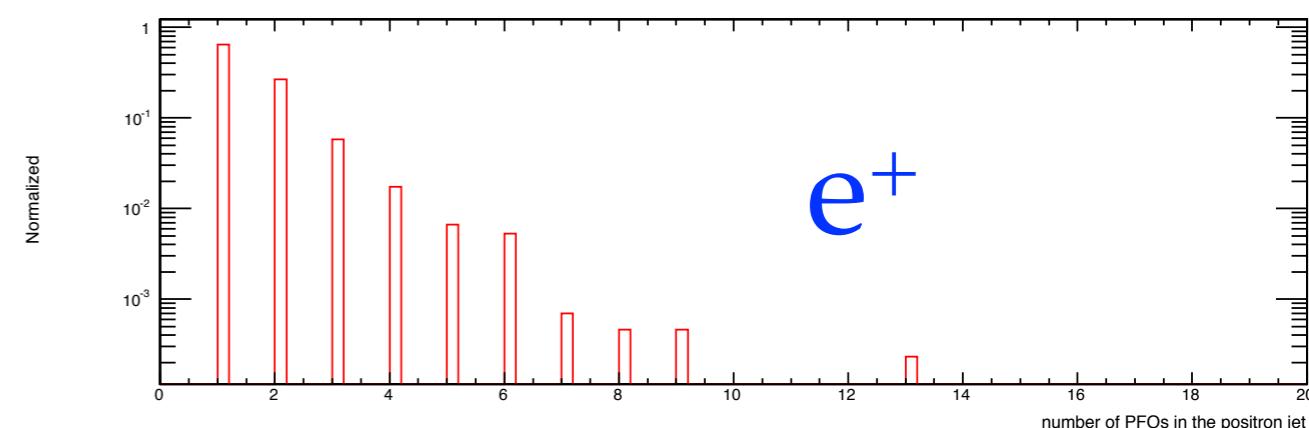
μ^-



e^-



μ^+

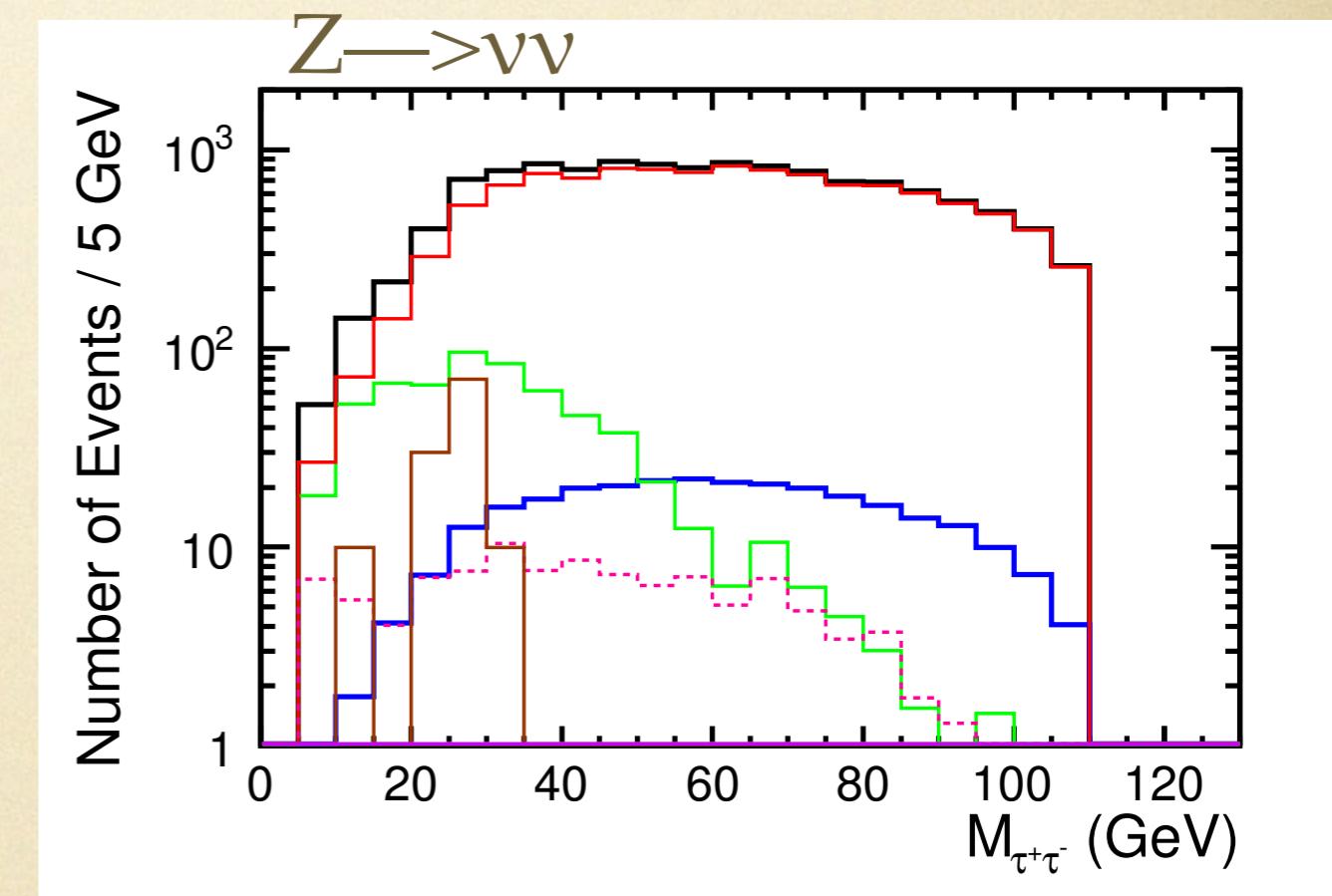
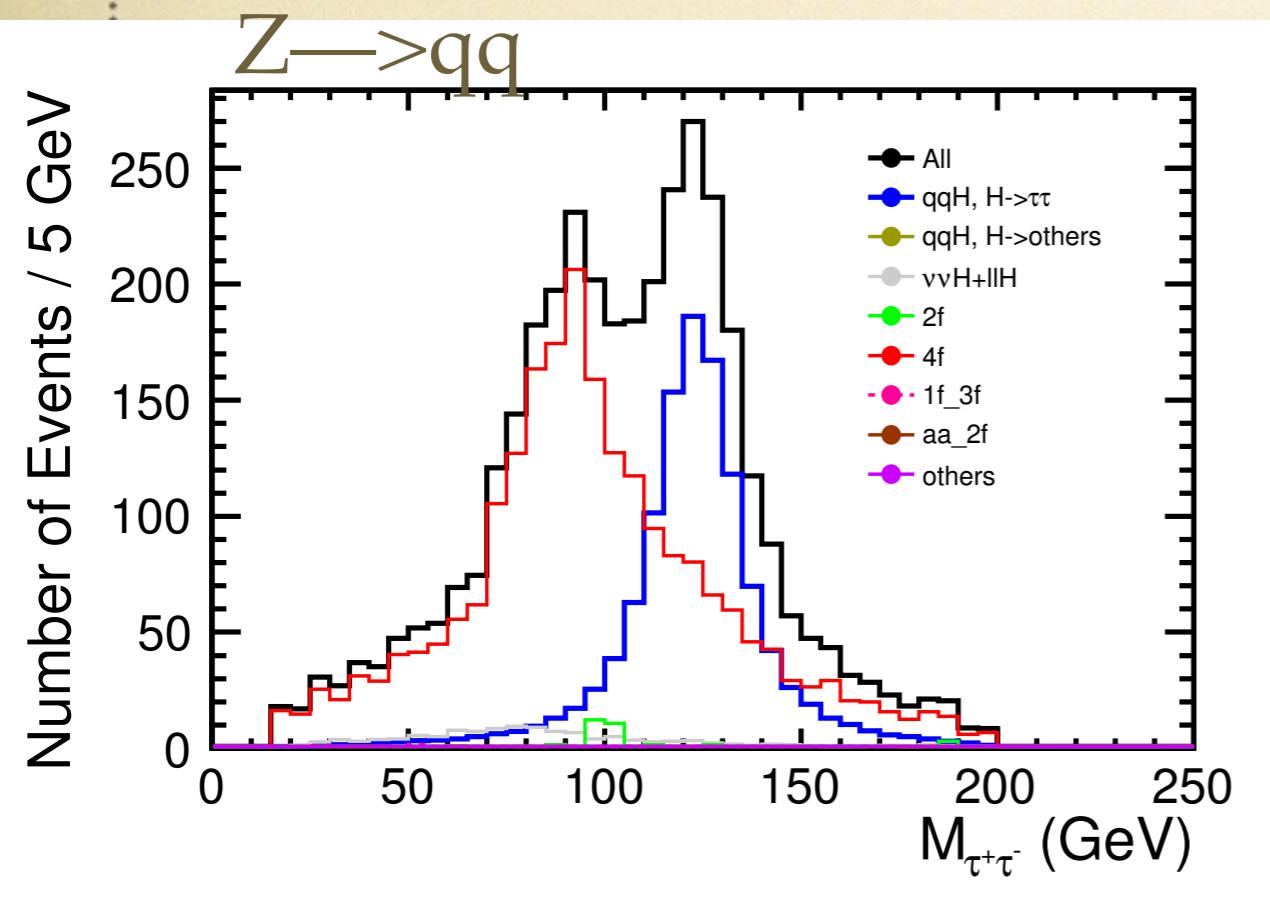


e^+

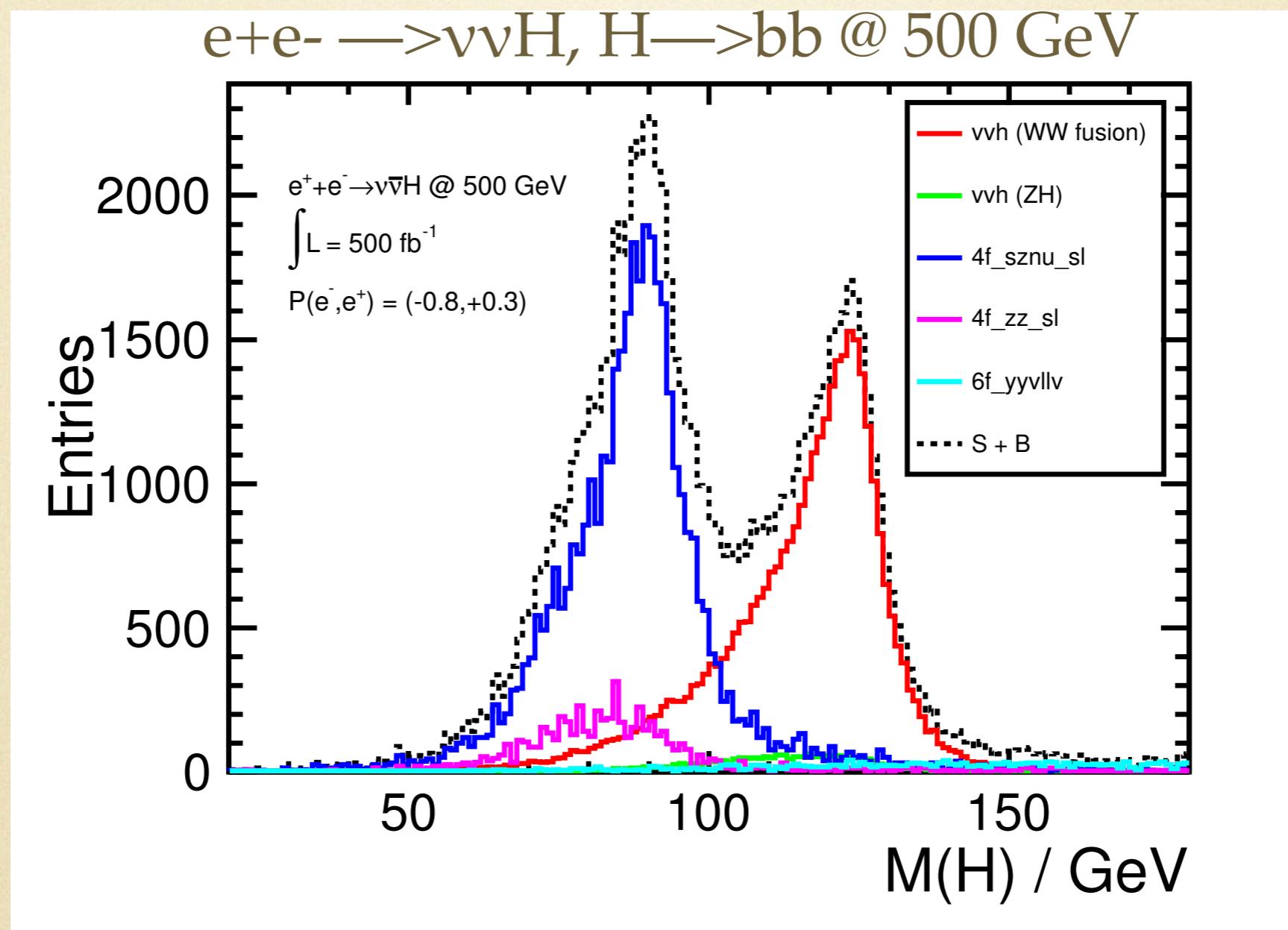
kinematic reconstruction of $\tau \rightarrow \nu X$

e+e- \rightarrow ZH, H \rightarrow $\tau\tau$ @ 250 GeV

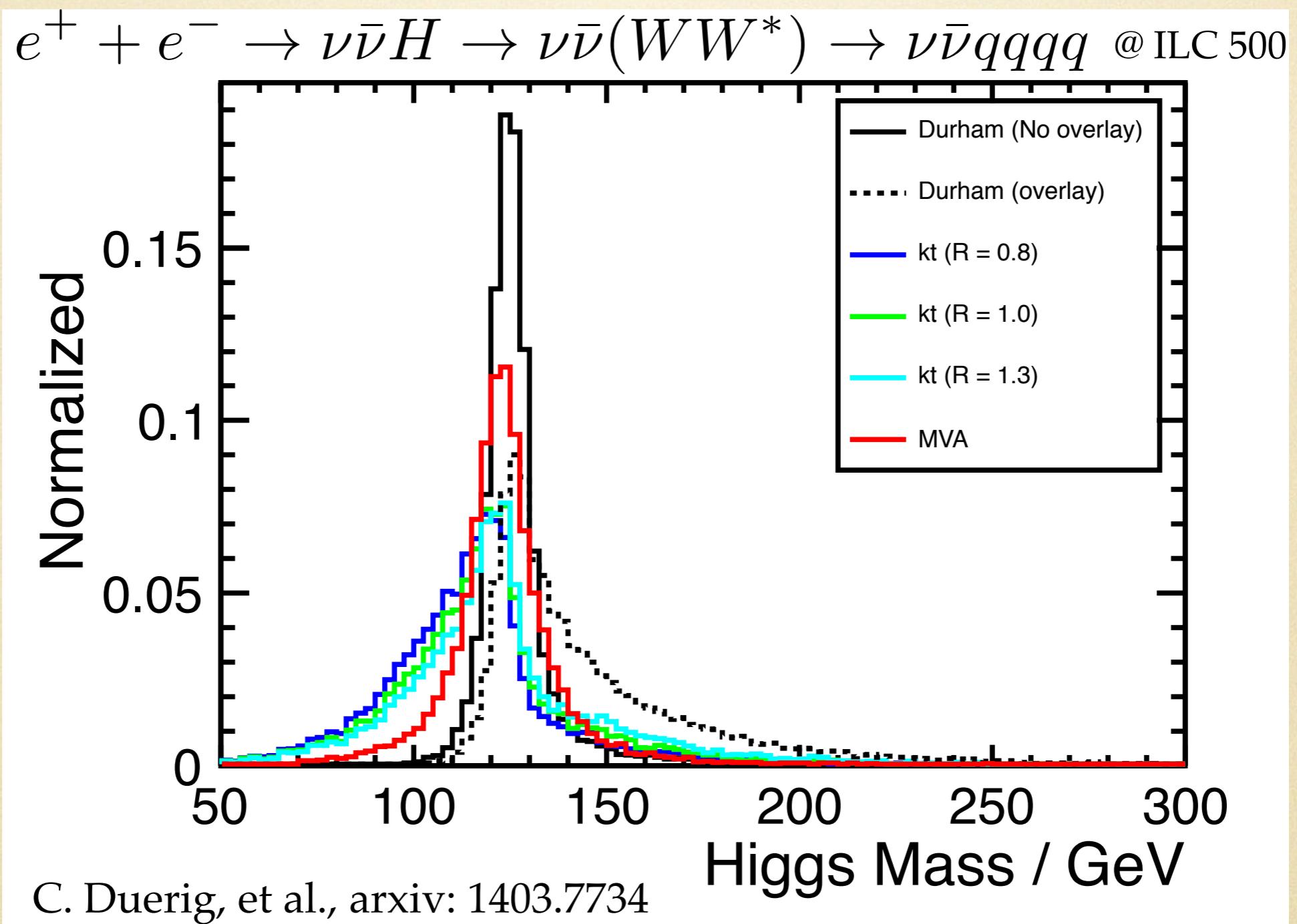
S. Kawada



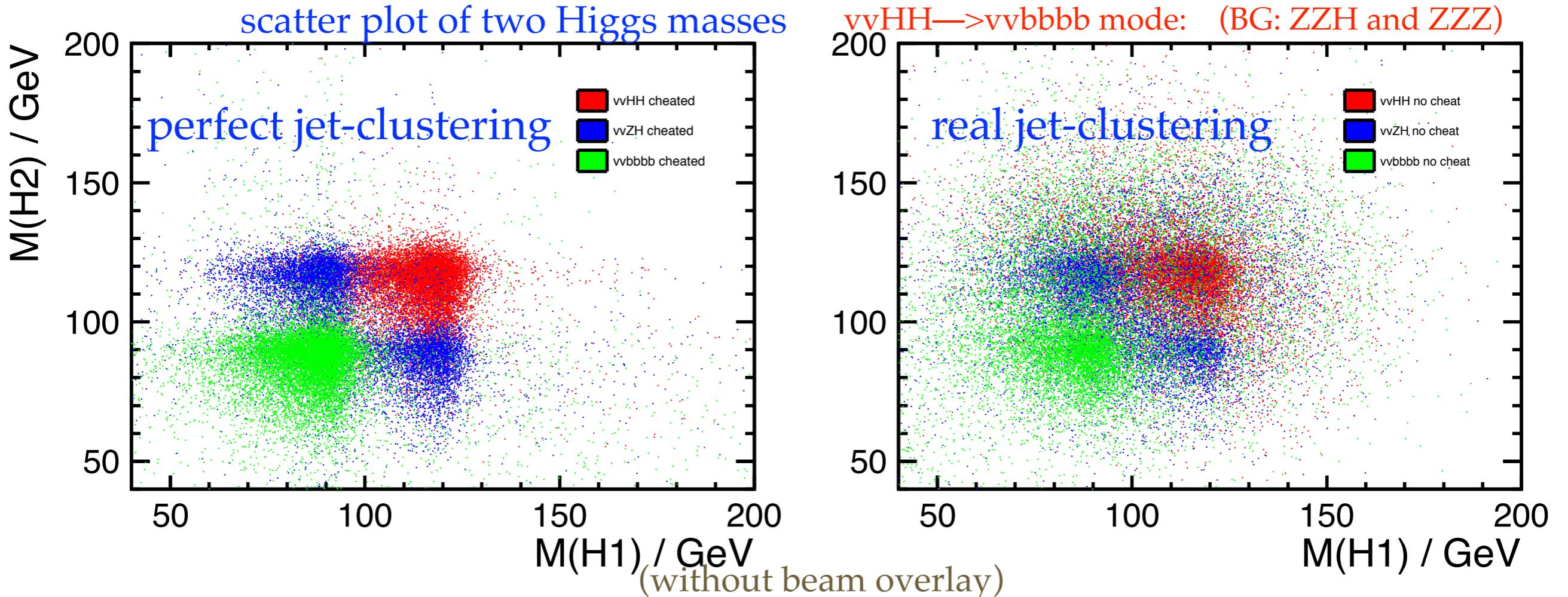
can we measurement H mass using $H \rightarrow bb$



impact of beam overlay



impact of jet clustering algorithm



a very useful workshop

- get the tools available
- get the relevant people together
- make the homework clearer and easier
- thank Jenny for the tremendous effort to make this happen nicely
- what's really missing is A Group Photo