$gg \rightarrow A \rightarrow \tau^+\tau^-$ in RunIIa

Outline

- Follow Amy's analysis
- More acceptance:
  - New $\tau \rightarrow \mathrm{had}$ trigger
  - Plug electrons and forward muons
- Eventually combine with b-channels of A/H, but $A \rightarrow \tau^+\tau^-$ doesn't need Si, so hopefully could be quicker result
- $\sigma(gg \rightarrow A) = 61.5\ \mathrm{pb}^{-1}$ at $\tan(\beta) = 50, m_A = 95\ \mathrm{GeV}$. ($\tan(\beta) = 30$ would give 22.1 pb.) $\mathrm{Br}(A \rightarrow \tau^+\tau^-) = 0.1 \Rightarrow 308\ A \rightarrow \tau^+\tau^-$ events with 50 pb^{-1}.

Group Needed to Study

- STNTUPLE common framework: Pasha interested in taus and is ntuple Czar

- Triggers
  - Need trigger Emulation: Pasha made W/Z/H to τ MC with MC+trigSim+Production+stntuple in `fcdfsgi2:/cdf/data05/s0/commission/tau/mc/`
  - Hadronic tau trigger(s): Ditau stream–Fedor. Needs to be commissioned
  - Leptonic tau triggers: CMU, CMX, e exist–UCD, TA&M. Can be looked at specifically for $A \to \tau^+\tau^-$

- Missing Et reconstruction!
  - What exists now?
  - Tower-by-tower calibration?
  - Energy scale
  - Miniplug: generator level study for possible improvement to resoltuion

Group Needed to Study

- Plug reconstruction
  - Could use central jet + plug electron, forward muon trigger
  - Forward tau reconstruction using Si standalone

- Tau reconstruction: Core work done! Pasha, Fedor, et al

- π^0 reconstruction: Anton, local expert, volunteers ;)

- Need tool for estimating τ eff
  - Replace e with τ in Weν data: Aaron and/or student
  - Longer term push to understand tracking eff, weights

- MC, bg
  - 2-jet, tau-fakes
  - bb

- $\mathrm{Z} \to \ell^+\ell^-$
- $\mathrm{Z} \to \tau^+\tau^-$
- $\mathrm{Z} \to \mathrm{q\bar{q}}$, $\mathrm{W} \to \mathrm{q\bar{q}'}$
- $\mathrm{W} \to \mathrm{l}\nu +$ jets
- Pasha now has signal MC ready to look at see above

Group Needed to Study

- $\mathrm{gg} \to \mathrm{A}$ is largest Higgs cross section at high $\tan(\beta)$, complimentary to LEP $\Rightarrow$ propose that we tackle this first

- tau channels cleaner $\Rightarrow$ should be first result in Higgs group

- Propose a (inter-university/lab) working group to make this happen ASAP