W/Z (→electron) analysis: Why we should get ready for early data taking

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A hypothetical scenario

Think of the following hypothetical scenario

- Today is February 19, 2010 !
- After a month of LHC running @3.5 TeV, CMS has recorded 1 pb^{-1} of data !
- Electron triggers have not been fully understood yet
  - We are working with lowest un-prescaled single photon trigger
  - Electron energy scale hasn't been derived yet

    $\Rightarrow$ Z mass peaks at 88 GeV/c^2 (say)
  - Electron skims (*Egamma* or EWK-e) aren't available in DBS !
  - Electron isolation, id, tag & probe efficiency not available yet !

Folks, at some snapshot in time this scenario will very likely be a reality !!! Maybe, this *reality* can even last for a while !
This and next three slides are intended to provoke a discussion.

The CMS priority will change accordingly

Assuming the scenario described in previous slide, suppose:

- So far we have planned and prepared for a precision measurement with W/Z
  - few thousands Z and few tens of thousands of W
- But in the evolving scenario
  - we may be asked to perform an analysis with few hundred Z
  - or to provide a key plot (say, Z mass, electron E_T distribution, ...) overnight for public presentation on the very next day.
- We therefore need to change gear and get ready for a quick first-pass analysis

What we can do .... starting now

✓**Prepare the analysis workflow**
- **Assign each person a primary task**
- **Put all the scripts for first analysis in cvs**
- **Automate whatever we can ...**

✓**Focus on completing the Z analysis in one week period**
- **@10% precision level !**
- **Speed is the key here: get the result first and then work on the improvement**
- **Can use Z lineshape fit to estimate signal yield for this round of analysis**
- **Can use the integrated average efficiency in a single bin**
- **Try to estimate energy scale quickly using few coarser bins**

✓**Be ready for surprises and to adjust our strategy**
- **e.g., we may have to work with photon triggers, or worse - EE trigger may not be available, or we may be dealing with substantially higher backgrounds, PUs etc.**

Get the logistics in place

- ✓We will have back-door access to entire data (at least till the end of 2010) through FNAL Tier-1
  - We can run our skim and produce necessary edm::tree, TTree, histograms within 24 hours (have a working version of skimming and ntupling in place)
  - But first will need to understand which trigger(s)/PD to use
- ✓Once the above step is done, need to have dedicated man-power for the following steps:
  - Electron selection optimization
  - Electron energy scale and resolution
  - Z-lineshpape fitting, background-subtraction machinery
  - Efficiency estimation (tag & probe), Acceptance
  - Theory prediction, ...
- ✓Need to establish a mechanism to meet at short notice
  - For now, we can review our preparedness in every biweekly meeting; start working as a close group.