Improvement in DT Segments reconstruction

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Ewk/Met kickoff meeting
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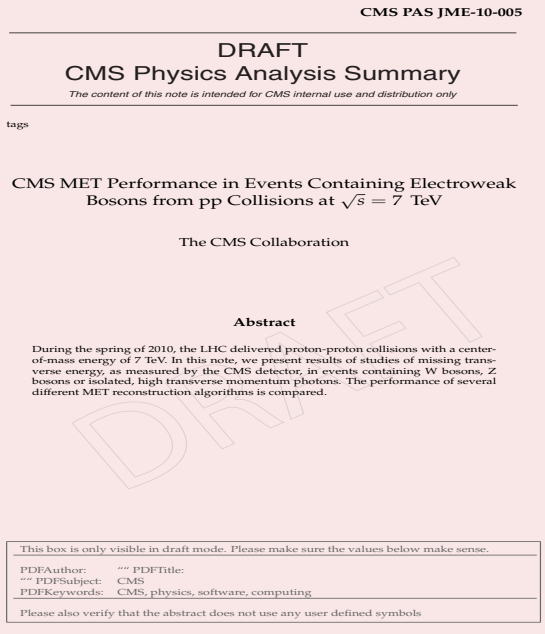
Why

Performance of Missing Transverse Energy Reconstruction in events from pp collision data with $\sqrt{s} = 7\ TeV$ containing EWK bosons.



CMS PAS JME-10-005

DRAFT
CMS Physics Analysis Summary

The content of this note is intended for CMS internal use and distribution only

tags

CMS MET Performance in Events Containing Electroweak Bosons from pp Collisions at $\sqrt{s} = 7$ TeV

The CMS Collaboration

Abstract

During the spring of 2010, the LHC delivered proton-proton collisions with a center-of-mass energy of 7 TeV. In this note, we present results of studies of missing transverse energy, as measured by the CMS detector, in events containing W bosons, Z bosons or isolated, high transverse momentum photons. The performance of several different MET reconstruction algorithms is compared.

DRAFT

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PDFAuthor: "" PDFTitle:
"" PDFSubject: CMS
PDFKeywords: CMS, physics, software, computing

Please also verify that the abstract does not use any user defined symbols

- Select W and Z in electron and muon channel, following recipes from VBTF.
- Study MET(s) (Calo - raw and Type-I, Type-II corrected -, Tc, PF, . . .) for W events, w and w/o the lepton removed (recoil);
- Study MET(s) in Z events with and w/out one and both lepton(s) removed;
- Also high-pt isolated photons.
- If possible, study also W/Z+N-jets events;

Editors J.Alexander (senior)
S.Lacaprara and A.Apresyan

Today

- Present updated schedule (two week earlier);
- Present and discuss list of plots with names of who does what
- Agree on basic selections;
- Feedback from you!
- Status report (much appreciated) by Michael, Matthieu, Jordan, Mara, Ulla and Freya

New TWiki Address and PAS svn browser

`https://twiki.cern.ch/twiki/pub/CMS/EwkMetComm`

`https://svnweb.cern.ch/cern/wsvn/tdr2/notes/JME-10-005/trunk/`

Preliminary general selection

- Use standard selection of goodcoll/run: see Collisions2010Recipes
- Select W and Z in electron and muon channel, following recipes from VBTF, including trigger, lepton/JetID . . . : loose in MET/MT cut.
- Use all MET(s): Calo -raw, Type-I, Type-II corrected-, Tc, PF;
- Always including the official ecal/hf cleaning suitable for each MET(s);
- want to study MET and hadron recoil.
- define *recoil* as MET removing the lepton(s) for W and Z events, including the e/hcal deposit associated to the lepton (muon included)
- W–Ersatz (Z with 1 lepton removed and M_Z/M_W rescaled) is more relevant for W fit and background determination. Would need a sizeable Z statistics, which we might not have by pas time

W: initial plots list

In both $W \to \mu\nu$ and $W \to e\nu$ channels!

- MET/MT distribution in W candidate events and decomposition;
- recoil distribution in W candidate events;
- opening angle between lepton and recoil;
- opening angle between lepton and recoil as function of recoil magnitude (scatter plot);
- if possible, reproduce MET distributions in W candidates with $>= 1$ jet ($>= 2$ jets, $>= 3$ jets);

Z: initial plots list

In both $Z \to \mu\mu$ and $W \to ee$ channels!

- MET distribution and decomposition
- recoil distribution
- recoil versus qT (Z-momentum) (scatter plot)
- opening angle between recoil direction and the direction of qT
- opening angle between recoil direction and the direction of qT versus the magnitude of qT (scatter plot)
- component of recoil perpendicular/parallel to bisector
- component of recoil parallel to bisector versus component of qT parallel to bisector (scatter plot)
- mean and RMS value of component of recoil parallel to bisector versus component of qT parallel to bisector
- if possible, reproduce plots above for Z events with $>= 1$ jet, $>= 2$ jets

$\gamma + jet$: initial plots list

$\gamma + jet$

- recoil distribution
- recoil versus qT (scatter plot)
- opening angle between recoil direction and the direction of photon
- opening angle between recoil direction and the direction of photon versus photon momentum (scatter plot)
- component of recoil perpendicular to photon
- component of recoil parallel to photon
- component of recoil parallel to photon versus photon momentum (scatter plot)
- mean value of component of recoil parallel to photon versus photon momentum
- RMS value of component of recoil parallel to photon versus photon momentum
- ratio of the component of recoil parallel to photon over photon mome

Who does what

General comment: many people are interested in $VB + N_{jets}$. We assume that $N \in \mathbb{N}$, namely include also $N = 0$. Not clear if we will have enough statistics by deadline for $N > 0$;

Muon channel

- $W \to \mu\nu$: Padova+CIEMAT+Pflow[a]+CalTech+Brown+Cornell (Met significance)
- $Z \to \mu\mu$: Padova+CIEMAT+UIC+CalTech

[a] which is not an institute, we know!, but is quicker to refer to this way

Electron channel

- $W \to e\nu$: IC+Wisconsin+Roma+Saclay+Minnesota+MIT+Cornell (Met significance)
- $Z \to ee$: IC+Wisconsin+Roma+Saclay+Minnesota+MIT

Who does what /II

$\gamma + jet$

- Texas+Hamburg

remarks

- Please see `task` from TWiki Page for more detailed list
- Do we missed someone???
- it would be nice to have two groups people for each plot (or set of plots) to share and cross check results Almost true everywhere
- Warning: we will bug you for plots!
- Please send us any past AN/PAS you think is relevant for this work

NEW timescale

Timescale anticipated by two weeks!

May 3	We'd like to have a set of preliminary plots, data/MC with the available statistics collected so far;
May 17	Physics week: show status report;
May 31	Freeze data. $\int \mathcal{L} \sim 1\ pb^{-1}$?;
June 7	AN and PAS ready;
June 15	Pre-approval;
June 28	ARC ok (meaning hard interaction with ARC in the previous weeks);
July 5-8	Approval;
July 22-	ICHEP;

Time was short, now is SHORTER!
We are preparing a draft 0 of paper, later today.