Missing E_T Significance Tutorial

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Overview

- New versions of ObjMissingET and MissingETSigEvent have been created in CVS
- MissingETSigEvent is officially tagged into 2.X.0 nightlies
- The structure of ObjMissingET is largely unchanged with the addition of METSig
- METSig is implemented as an extra AlgTool which is run at the end of the ObjMET sequence
- All function related to MET significance variable calculations reside in ObjMissingETSigTool.cxx
- MissingETSigEvent is just a light-weight header class for talking to StoreGate and persistency

Event Object Layout

- Each METSig object is represented by:

$$(type, \eta, \phi, E, \sum E_T^B, \sum E_T^E, \sum E_T^F)$$

corresponding to the type of the object (electron, muon, jet, mini-jet, etc.), the pseudorapidity, the azimuthal angle in the transverse plane, the energy E or transverse energy E_T, and the summed E_T in the barrel, endcap and forward regions of this object

- These vector representations, which is extendable, are templated and put together in a class named MissingETSigObjContainer which is recordable into SG

- ObjMissingETSigTool finally receives the container as the input and do subsequent significance computations

The Resolution Tables

- The resolution tables are based on 12031 full simulation and hard-coded currently — can move to jobOptions later
- Each object's resolution has the following lookup tables:

Object	Type	Lookup keys	S/D Gaussian	Bifurcated
Electron	1	η, E	D	Yes
Muon	2	η, E_T	D	No
Jet	3	η, E	D	No
CaloMuon	4	η, E_T	D	No
MiniJet	5	$\sum E_T^B, \sum E_T^E$	S	No
Unclustered	6	$\sum E_T^B, \sum E_T^E, \sum E_T^F$		

Ntuple Variables

```
ObjMET_ExMissFinal;
ObjMET_EyMissFinal;
ObjMET_EtSumFinal;
ObjMET_EtMissFinal;
ObjMET_PhiMissFinal;
ObjMET_Sig;
ObjMET_sL;
ObjMET_sT;
ObjMET_d0var;
```

Final reconstructed quantities

MET significance

Longitudinal resolution

Transverse resolution

D0 discriminator