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Phase-I Simulation - LAr & Groups

Introduction

This page documents activities and associated supporting information for simulation studies for the Phase-I upgrade of L1Calo. The current state-of-play is summarised here and new results, as they arrive, will be indicated. Thus, of necessity, it is an evolving document.

Studies

LAr Studies (for Phase-I TDR)

Signal Feature Reconstruction

Study	Status	People
Filter algorithms and energy resolution		
Pile-up and noise filtering		
Out-of-time pile-up corrections		
Impact on energy resolution from phase-shift and jitter		
Dynamic range and quantization scale		
BCID		
Signal saturation		
Optimization of signal reconstruction in different eta regions and calorimeters		

EM Trigger Performance

Study	Status	People
Shower shape analysis in EM layers		
Optimization of shower shape variables in different eta regions		
Energy dependency of R_eta algorithms		
Multi-dimensional discriminants		
Clustering algorithms for HL-LHC		
Dependency on quantization scale		

Jet Trigger Performance

Study	Status	People
Evaluation jet reconstruction algorithms in inclusive triggers		
Gaussian filtering and turn-on curves		
Pileup background subtraction		
Effects of quantization scale		
Multi-jet trigger efficiency recovery		
Jet energy scale and calibration		

MET Trigger performance

Study	Status	People
Resolution dependency on layer weighting and layer pT thresholds; Eta dependency		
Impact of FCAL granularity on resolution and turn-on curves		
Effects of BC mis-identification on resolution		
Effects of ADC quantization scale		

Tau Trigger Performance

Study	Status	People
Discriminant variables for tau identification (em radius, core energy fraction, radius, cluster mass type, em fraction, sub-clusters)		

Electron veto by em isolation and em fraction		
Dependency on eta regions and detectors		

Impact of single and di-em trigger performance on physics searches

Study	Status	People
H -> gamma gamma		
H -> Z gamma		
H -> tau tau -> ee		
H -> WW* -> e nu		

Supporting h/w design choices

xFex TOB output multiplicities

Priority: initial results are needed by early summer 2014 as input to the eFex prototype (scheduled for manufacture early 2015) design process.

Description: this activity will study the connectivity requirements (including bandwidth, data formats, overflow handling, etc.) between the eFEX modules and L1Topo modules and the potential impact on physics triggers of any constraints or limitations in this area. The study will use realistic emulations of Trigger Objects reflecting the desired physics goals and take into account the level of pileup that is anticipated. The simulation results will feedback into the eFEX design process and as such will be both timely and have significant importance in the upgrade of L1Calo at Phase-I.

1. Bunch train effects
2. Consequences for L1Calo of LPDS design choices
3. The gFex

Supporting algorithm choices

e/

Jet

Missing Et (and other global event quantities)

Datasets

Major updates:

-- RobinMiddleton - 19 Nov 2014

%RESPONSIBLE% RobinMiddleton

%REVIEW% **Never reviewed**

This topic: Sandbox > L1CaloUpgradePhase1Simulation

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