Introduction

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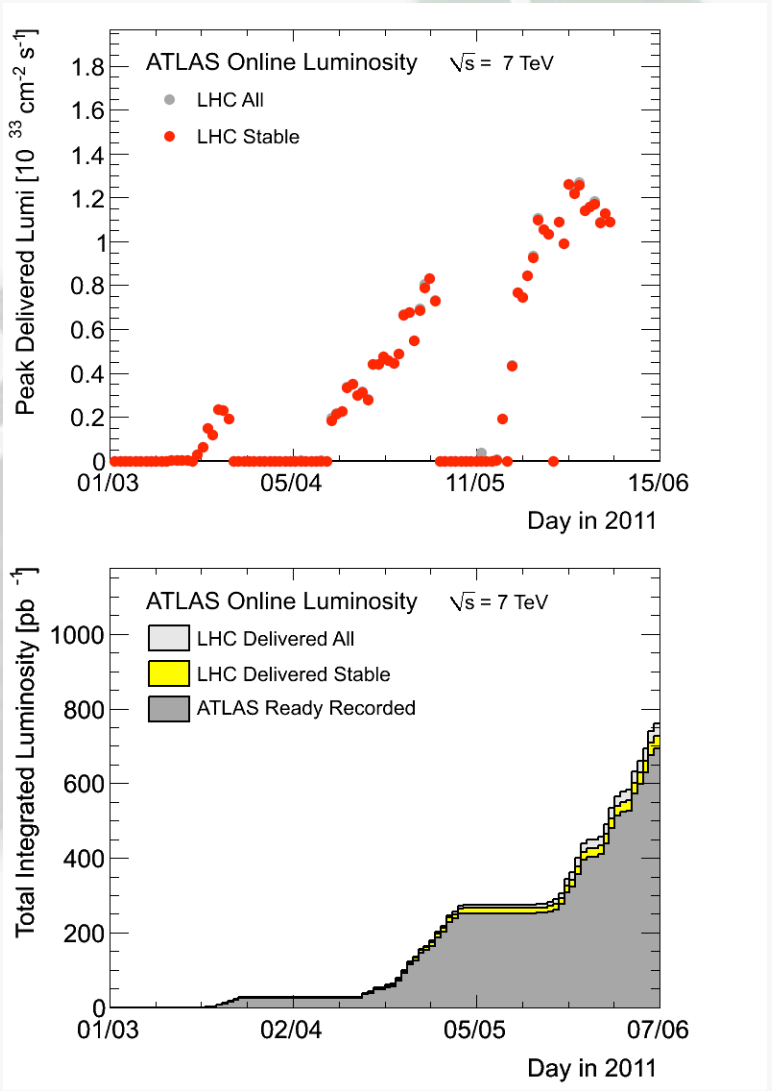
HSG5 H->bb weekly meeting, 7 June 2011

News! News! News!

- About 0.7 fb^{-1} collected with stable beams so far
- Up to 1042 bunches colliding in ATLAS
- Lumi around $1.2x10^{33}cm^{-2}s^{-1}$
- Will keep number of bunches and bunch charge until we get $\approx 1fb^{-1}$ in time for EPS



Trigger News

- Evolution for 2 – 5x10^{33} $cm^{-2}s^{-1}$ being planned NOW
  - Strawman plan with detailed prescales can be found here: https://aagaard.web.cern.ch/aagaard/Rates/Evolution50nsVeryTight5e33/
  - **mu20(_MG) disabled** – new primaries will be mu22 and mu20i
  - **e20_medium1 disabled** – new primary will be e22_medium1
  - **EF_2b10_medium_4L1J10 disabled** – should have EF_b10_medium_4j30_a4tc_EFFS or EF_2b15_medium_L1_2J10J50
  - See slides by Eric and Chris today

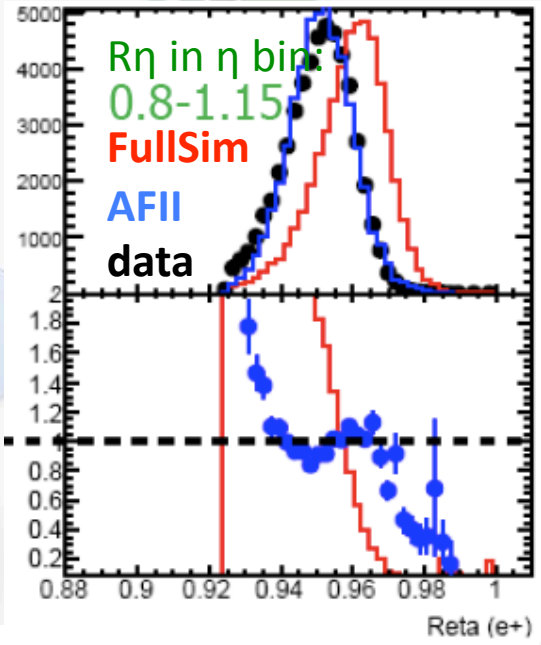
- E.g. muon trigger rates:
  - L=3E33: mu22_medium: 55Hz; mu22_MG_medium: 60Hz; mu20i_medium: 20Hz
  - L=5E33: mu24_medium: 61Hz; mu24_MG_medium: 67Hz; mu20i_medium: 33Hz

- Use **sample T** for study:
  - r2400 has conditions which do NOT include the noise suppression.
  - r2434 has conditions which DO include the noise suppression.
  - Find samples with e.f.: dq2-ls "valid*r2434*"

- Results being collected by Stefania to show at the Trigger General Meeting tomorrow: https://indico.cern.ch/conferenceDisplay.py?confId=142271
  - Slides on H+ from Liron and from Chris on ttH already in place but nothing from WH, ZH, VBF

Atlfast – II

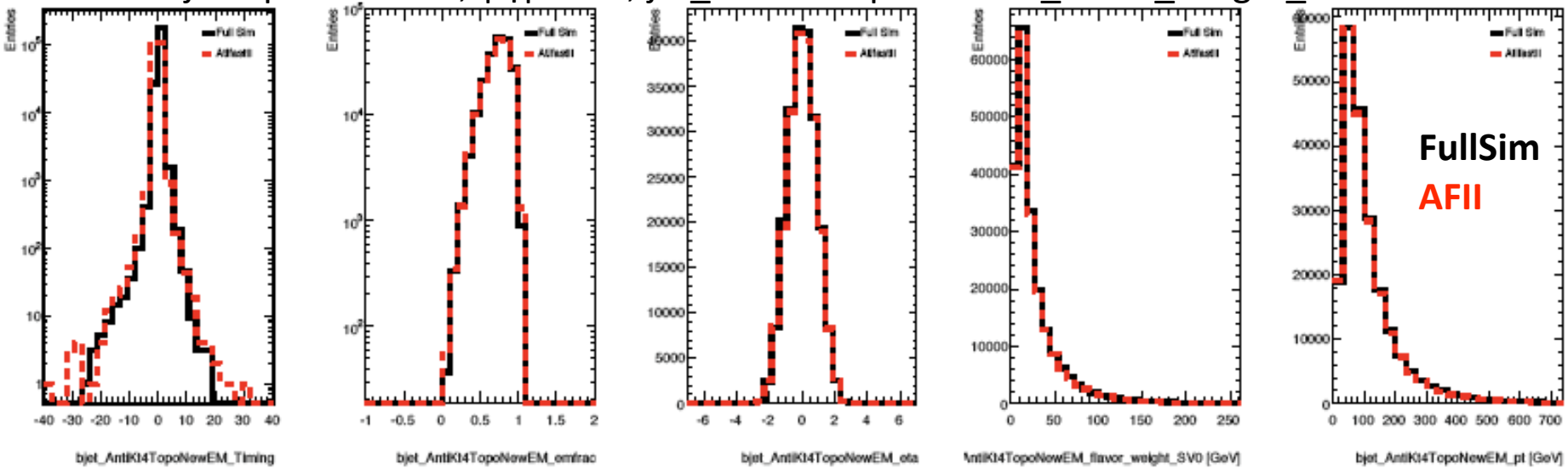
- Seems to be reaching maturity
- Should provide factor 10-20x speed improvement
- Shows good agreement with data
- Can be tuned to data, unlike full-sim
- SUSY group will pioneer using it for a publication
- See e.g. simulation meeting today: https://indico.cern.ch/conferenceDisplay.py?confId=141119



· Agreement at 1% level

flavour truth = 5

b jets: pT > 20 GeV; |η| < 2.8; jet_AntiKt4TopoNewEM_flavor_weight_SV0 > 5.85



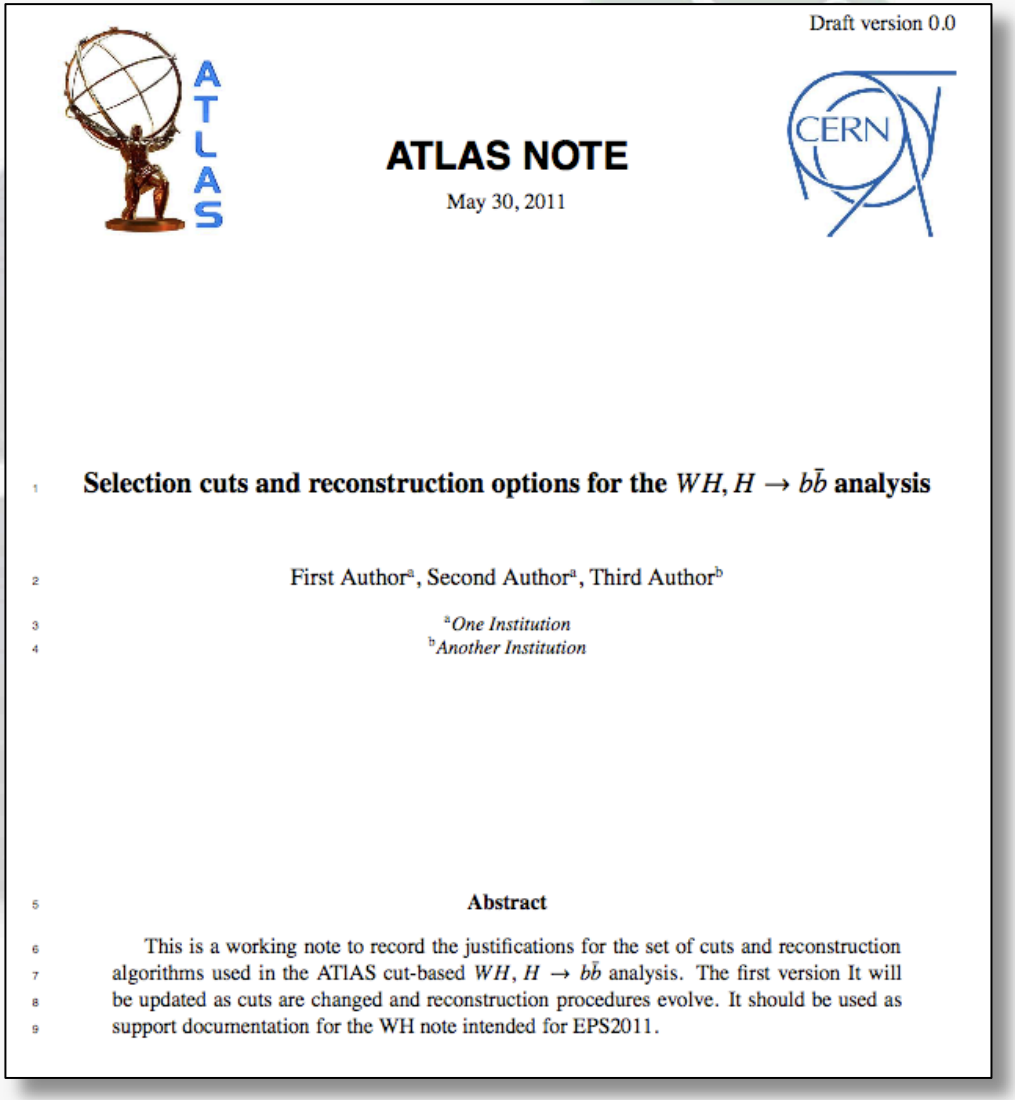
CONF note for EPS-HEP 2011

- Tight time scale – but feasible!
  - First **INT** note draft should be ready on 10 June
  - Finished – Higgs approval – by the end of June at the latest
  - Data frozen for EPS on 22 June – expect final calibrations etc soon after
  - **CONF** note circulated early July to be approved before conference
  - Conference starts 21 July

- Notes:
  - Re-using existing CDS number ATL-COM-PHYS-2010-929
  - Having a bit of difficulty finding willing and able editorial-board members
  - SVN area for note https://svn.cern.ch/reps/atlasgrp/Physics/Higgs/HSG5/data_7TeV/ATL_COM_PHYS_2010_929/trunk/

Documenting Cuts

- Draft note to document our current thinking about cut values and corrections
- Should give a frozen view of cuts used for summer note
- So that we will later know why we did something (and sometimes to know we had no good reason)
- For our own use – not even internal review
- Will send 1st draft around for additions/corrections/comments/ violent disagreement ☺



Draft version 0.0

ATLAS NOTE

May 30, 2011

Selection cuts and reconstruction options for the $WH, H \to b\bar{b}$ analysis

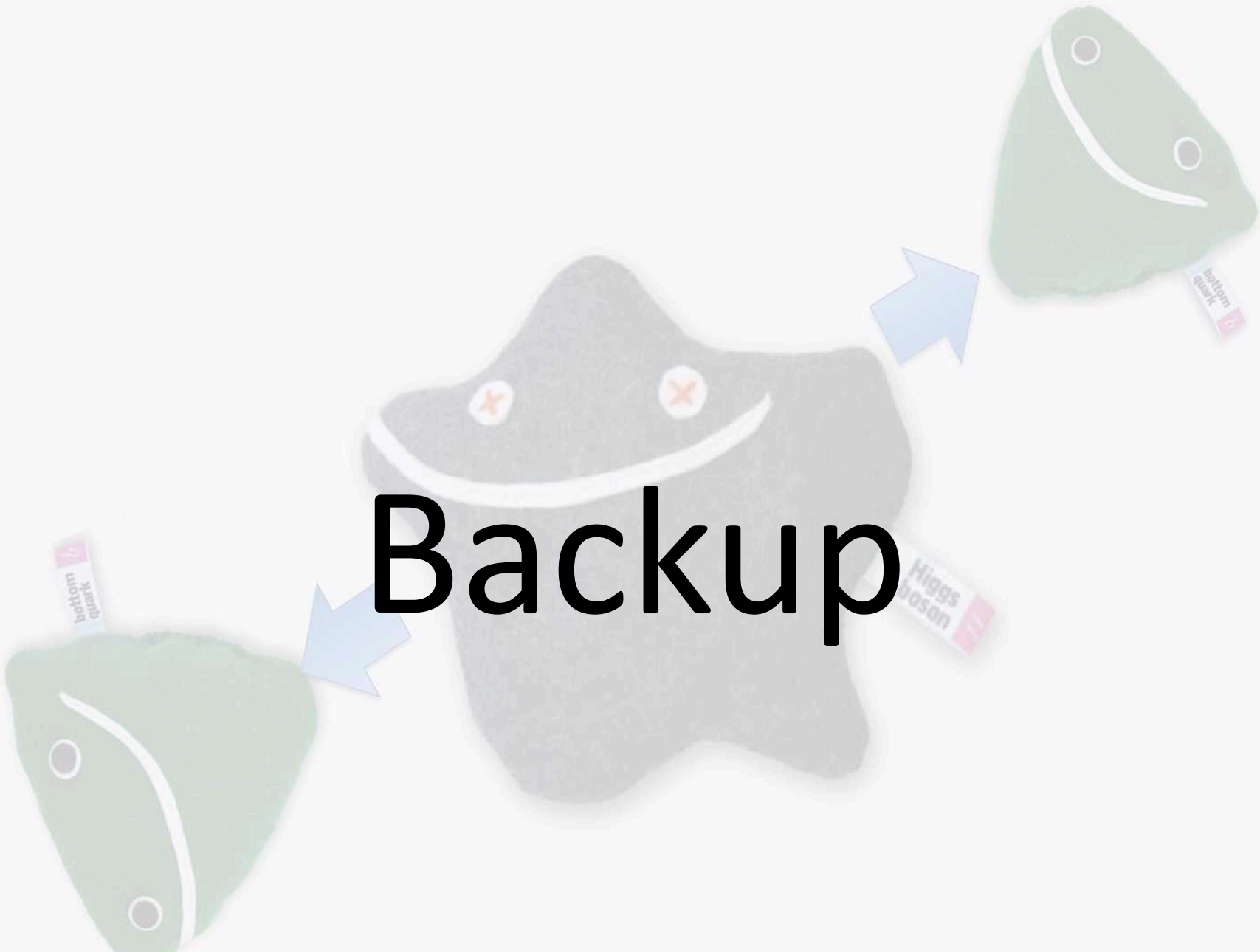
First Author[a], Second Author[a], Third Author[b]

[a] *One Institution*
[b] *Another Institution*

Abstract

This is a working note to record the justifications for the set of cuts and reconstruction algorithms used in the ATlAS cut-based $WH, H \to b\bar{b}$ analysis. The first version It will be updated as cuts are changed and reconstruction procedures evolve. It should be used as support documentation for the WH note intended for EPS2011.

Backup



Poster abstract for EPS-HEP

H->bb searches with the ATLAS detector at the LHC

The H -> bb channel is extremely important for the observation of a Higgs boson signal at the LHC. In the Standard Model, this channel would provide a significant contribution to the Higgs boson search in the low mass region, where this decay mode constitutes the dominant Higgs decay channel. Due to the enormous jet production cross-section at the LHC, the search must target channels where the Higgs boson is produced in association with a weak boson, a pair of top quarks, or jets separated by a rapidity gap. It also requires complex techniques to reconstruct the signal and separate it from an overwhelmingly large background. We present the status of Higgs searches in the H->bb channel currently being performed within ATLAS.

- In case it's accepted we'll need a candidate to present it at EPS
- Please let me know by email before Friday if you would like to do this
- Will randomly choose a presenter from candidates

- Conferences:
  - for EPS-HEP, focus on papers instead of notes
  - Higgs approvals for EPS-HEP: 20th – 25th July

Summer 2011 Conferences

- PLHC, June 6th ⟹ Higgs approvals next week at latest
- LHCC, June 15th
- EPS, July 21st ⟹ Higgs approvals June 20th - 25th
- Lepton-Photon, August 21st
- SUSY11, August 28th

Remarks:

- Run the analysis during approval process to update the results with new data.
- PLHC results: based on conference notes.
  (write them as short as possible, since these are based on Moriond 2010 notes.)
- EPS and beyond: should be aiming for journal papers.
  - In some cases, circulation to ATLAS could be shortened,
    as some analyses will be already documented for PLHC.
  - Approval of paper plots during Open Discussion meetings:
    only if the paper can be sumbited to arXiv within the next 10 (to 14) days.

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https://indico.cern.ch/getFile.py/access?contribId=0&resId=0&materialId=slides&confId=136406

ATLFASTII

M.Vincter

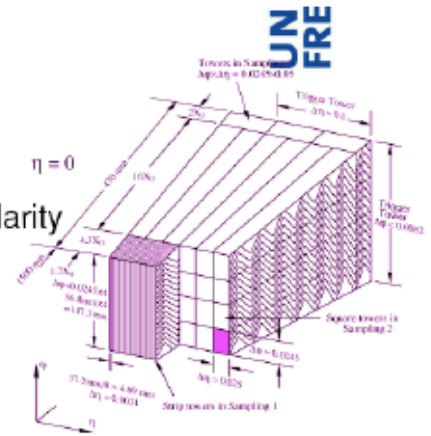
- Michael and friends have been developing a fast simulation for the calorimeter
- See nice presentation by Evelyn Schmidt at Marseille egamma workshop:
  - https://indico.cern.ch/getFile.py/access?contribId=17&sessionId=10&resId=4&materialId=slides&confId=99950
  - Shows first data comparisons with Zee tag and probe

Atlfast II

GEANT 4 simulation for Inner Detector and Muon Chambers
FastCaloSim for calorimeter simulation

FastCaloSim

Uses full ATLAS calorimeter with all calorimeter layer and full granularity
Simulation based on single particles (Athena v 14.1.0.2)
photons
electrons
charged pions (used for all hadrons)



→ **Parametrization of energy response and resolution** in all calorimeter layers including correlations of energy depositions (based on 2-dimensional histograms and correlation matricies

→ **Parametrization of average lateral shower shape** ⇦ I try to improve this

→ **FastClaoSim is running in Digi.Step ⇨ same noise model as used with GEANT 4**

→ **All standard ATLAS reconstruction code can be run**

Time Gain: factor of ~100 calorimeter simulation only
Factor 10 – 20 together with ID fullsim compared to full simulation depending on event type