My (group's) experience @LPC

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My (LPC) history

- I joined CMS and became a LPC user/visitor in 2006
- Brown University Post-doctoral research associate [2006 – 2008]
  - L1 HCAL trigger emulation, High-Level Trigger, EXO searches
- Faculty member at Boston University [2008 – present]
  - High-Level Trigger, Trigger Coordination, EWK, EXO, B2G

And now a short trip down memory lane…starting with the birth of CMSSW…

LPC Physics MC Production (2006)

Slide from my talk at LPC Physics Group Meeting

Group Activities

The formation of the group announced: June 15th Physics Group Meeting

AIM:

- Generate "standard" samples (only stable, "major" releases, may not include the latest and greatest developments)
  - for the benefit of developers, testers, and variety of users
  - easily accessible samples (dCache/CRAB)
  - collect all necessary information on a web page to enable a remote non-expert to start an analysis
- Reprocess with every major release of CMSSW
- Adjust based on reasonable requests (processes, # of events,…)

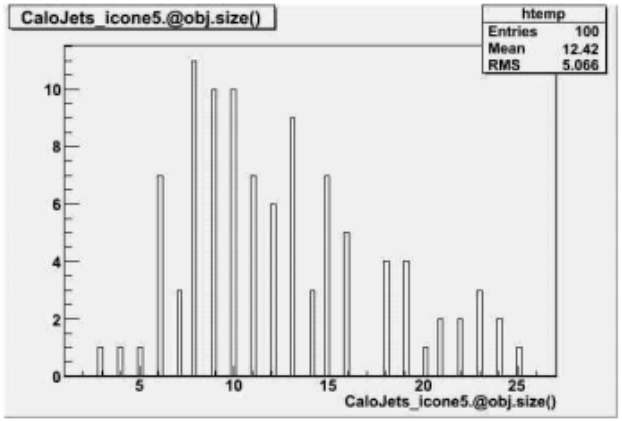
Julia Thom, Jennifer Vaughan, Rick Cavanaugh, Michael Schmitt, Tulika Bose, Dave Evans

Production with CMSSW_0_6_1

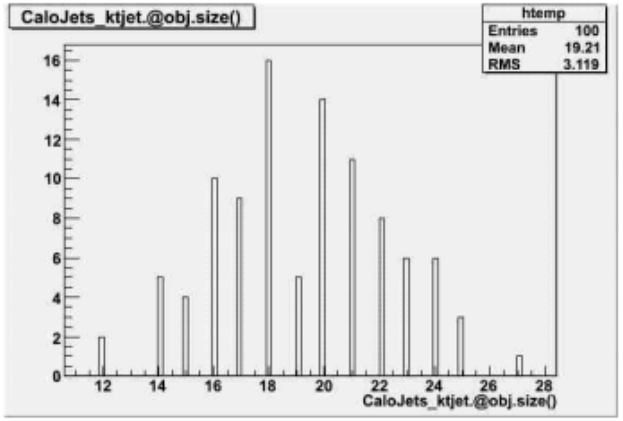
of reconstructed jets

In 100 events….

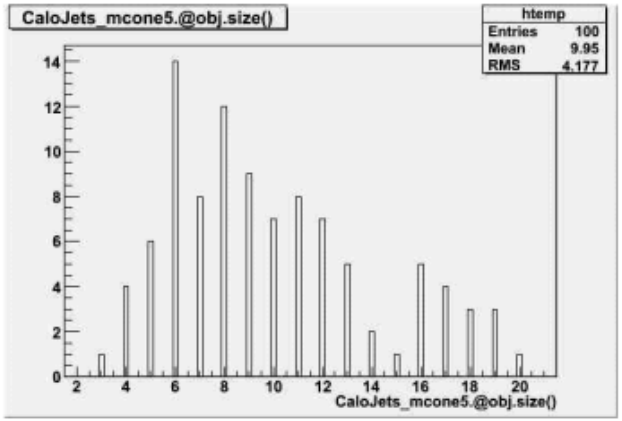
Iterative Cone



KT



Mid-point Cone



Slide from my talk at LPC Physics Group Meeting

Slide from my talk at LPC Physics Group Meeting

LPC Ongoing effort

Process	Goal	Current	Objects Reco-ed	Comments	Contact
Z->ee	10K	10K	Jet/MET, EM, ckftracks, b, tau, muon	No Roadsearch and GSF	Edgar Carrera
Z->mumu	10K	10K	Jet/MET, EM, ckftracks, b, tau, muon	No Roadsearch and GSF	Sergei Gleyzer
Z->tautau	10K	10K	Jet/MET, EM, ckftracks, b, tau, muon	No Roadsearch and GSF	Jim Dolen
Z'(700)->jets	4K	4k	Jet/MET, EM, ckftracks, b, tau, muon	No Roadsearch and GSF	Bose, Harris
Z'(2000)->jets	3K	3K	Jet/MET, EM, ckftracks, b, tau, muon	No Roadsearch and GSF	Bose, Harris
Z'(5000)->jets	3K	3k	Jet/MET, EM, ckftracks, b, tau, muon	No Roadsearch and GSF	Bose, Harris
Z->mumu gamma	10K	10K	Jet/MET, EM, ckftracks, b, tau, muon	No Roadsearch and GSF	Sergei Gleyzer
W(->e,MET)+jets	100K	100K	Jet/MET, EM, ckftracks, b, tau, muon	PU, No Roadsearch and GSF	Manoj Jha
W(->hadronically or e & MET)+jets	100K	100K	Jet/MET, EM, ckftracks, b, tau, muon	PU, No Roadsearch and GSF	Manoj Jha
J/psi->ee	6K	6K	Jet/MET, EM, ckftracks, b, tau, muon	No Roadsearch and GSF	Dmitry Bandurin
Upsilon->ee	6K	6K	Jet/MET, EM, ckftracks, b, tau, muon	No Roadsearch and GSF	Dmitry Bandurin
QCD	10K	10K	Jet/MET, EM, ckftracks, b, tau, muon	PU, No Roadsearch and GSF	Tulika Bose

1_2_0 samples

Slide from my talk at LPC Physics Group Meeting

Data discovery

How to access files ?

LPC Team's samples:

DBS page: http://cmsdbs.cern.ch/discovery/expert

Select the DevMC/Writer DBS instance

Select the CMSSW_1_2_0/FEVT/cmsRun Application

Select Primary datasets starting with LPCMC-120-*

Details in the wiki page
https://twiki.cern.ch/twiki/bin/view/CMS/CmsSamples

(is being updated as additional samples show up…)

W samples were produced using the UAF (not available via CRAB)

Online Selection →TSG

- Following the success of the LPC MC production effort I was recruited by the CMS Online Selection Group in early 2007 to help prepare MC requests for the Online Selection Group
  - https://twiki.cern.ch/twiki/bin/view/CMS/HighLevelTrigger06ExerciseMCSamples

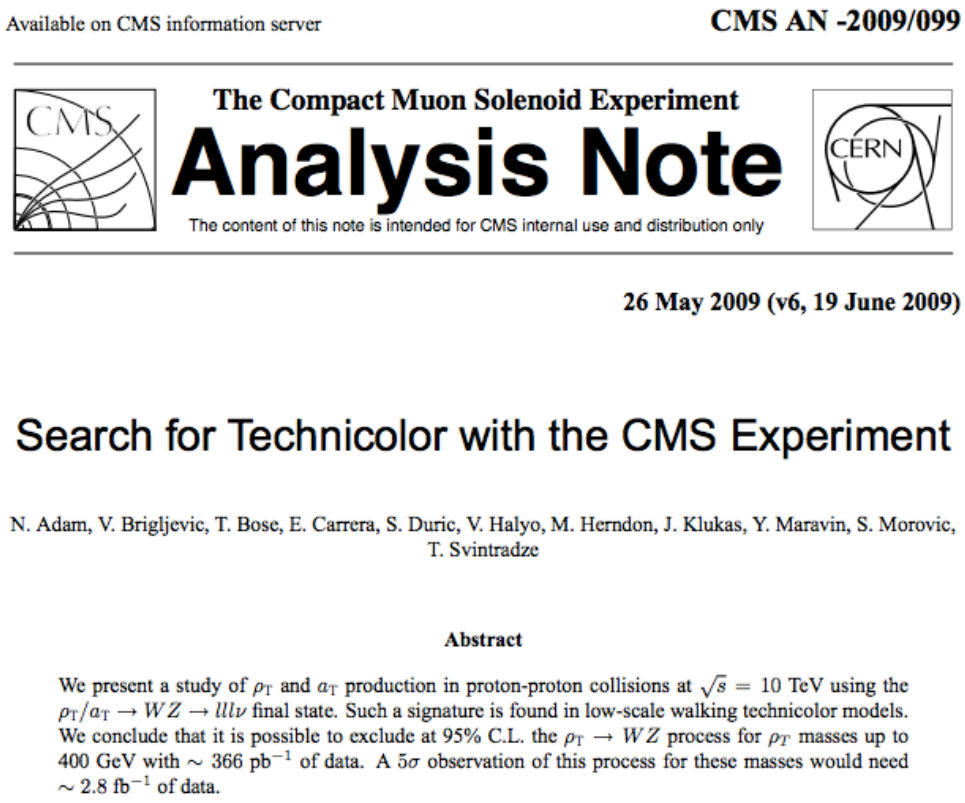
- Recruited (along with Len Apanasevich, Pedrame Bergassa et al) to participate in the "HLT Exercise")
  - First implementation of a trigger menu in CMSSW; measure rates for a 1E32 menu and CPU performance (LHCC review)

- Success of the HLT Exercise led to the formation of the "Trigger Studies Group"
  - LPC members in leadership roles since then

(Personally, I have not been able to successfully escape from the trigger group since then…)

Fast forward to 2008/09…

- Join Boston University as faculty
- Hire Edgar Carrera as post-doctoral research associate
  - LPC resident at the beginning and then HLT on-call expert @ CERN
- Start ramping up physics/data analysis efforts (in collaboration with other LPC residents/users)



Available on CMS information server

CMS AN -2009/099

The Compact Muon Solenoid Experiment

Analysis Note

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

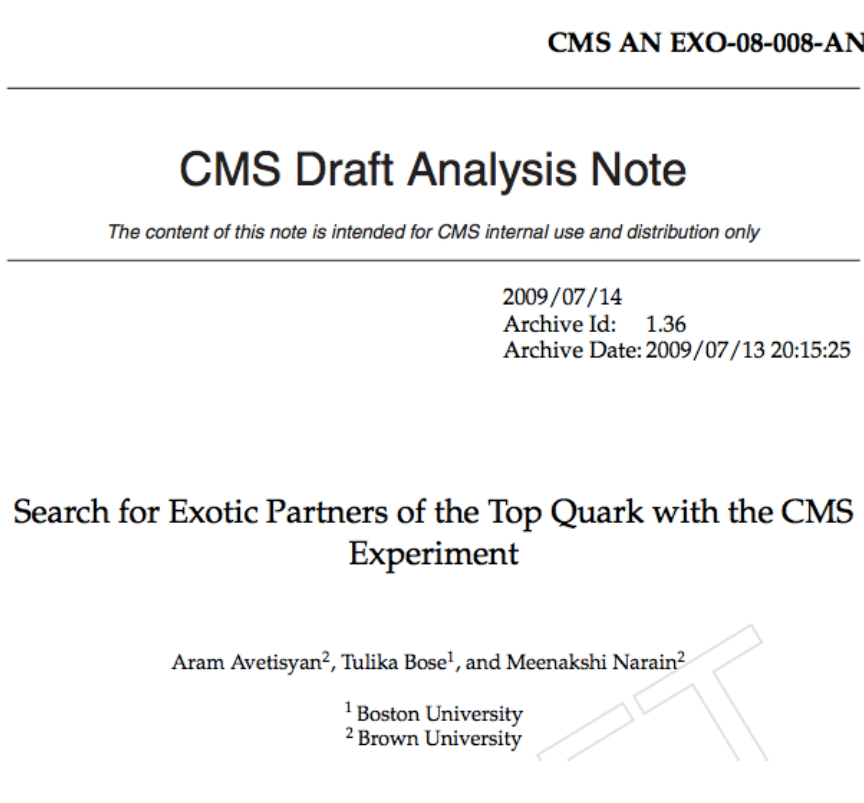
26 May 2009 (v6, 19 June 2009)

Search for Technicolor with the CMS Experiment

N. Adam, V. Brigljevic, T. Bose, E. Carrera, S. Duric, V. Halyo, M. Herndon, J. Klukas, Y. Maravin, S. Morovic, T. Svintradze

Abstract

We present a study of ρ_T and a_T production in proton-proton collisions at $\sqrt{s} = 10$ TeV using the $\rho_T/a_T \to WZ \to lll\nu$ final state. Such a signature is found in low-scale walking technicolor models. We conclude that it is possible to exclude at 95% C.L. the $\rho_T \to WZ$ process for ρ_T masses up to 400 GeV with ~ 366 pb^{-1} of data. A 5σ observation of this process for these masses would need ~ 2.8 fb^{-1} of data.



CMS AN EXO-08-008-AN

CMS Draft Analysis Note

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

2009/07/14
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Search for Exotic Partners of the Top Quark with the CMS Experiment

Aram Avetisyan[2], Tulika Bose[1], and Meenakshi Narain[2]

[1] Boston University
[2] Brown University

Fast forward to 2011

- Edgar Carrera takes up a faculty position at Universidad San Francisco de Quito (Ecuador)
  - He and his group continue to be LPC users/contributors
  - One of his first (undergraduate) students (Alejandro Gomez) is now a Rutgers graduate student and is collaborating with us on trigger development for Run 2

- Aram Avetisyan joins BU as post-doctoral research associate
  - Long-time LPC resident/user
  - 2-time LPC Distinguished Researcher

- Graduate students Cory Fantasia, David Sperka, Jason St. John collaborate with others at the LPC (and take full advantage of the LPC computing resources):
  - Results in multiple publications (7 & 8 TeV)…

- LPC members continue to have leadership roles in the trigger and successfully commission/run the HLT

Fast forward to 2013-2014

- Students Clint Richardson and Dylan Rankin start taking advantage of the LPC
  - CMS DAS, HATS
  - Expertize in JetMET algorithms
  - Collaborations with other LPC users on physics analysis
- They have already started to reap benefits:
  - Leading the development of triggers with jet substructure techniques
  - Clint: MET contact/expert for EXO
  - Dylan: Trigger contact for B2G
  - Will help facilitate the upcoming Trigger HATS @ LPC

Summary

- The LPC has been an amazing resource for my group at Boston University and for the CMS Trigger Studies Group at large

- It was a vibrant community of smart, active, dedicated people back in 2006 and at the start of Run 1 and its wonderful to see it even more energized as we prepare for Run 2 and the discoveries it may have in store for us….