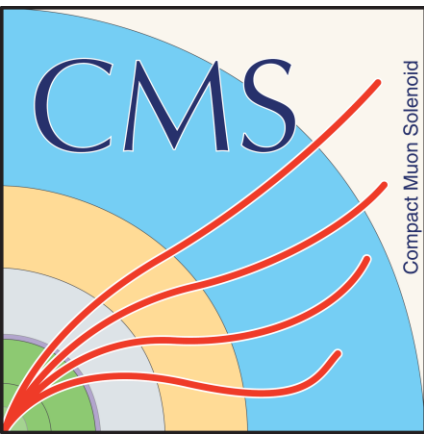# *Chung-Yao Chao Fellowship Interview 2018*

Andrew Levin

Peking University

27 March 2018

Resume

- High School Diploma, from Glenbrook South High School near Chicago, in 2006
- B.A. in Physics and Mathematics, from Vanderbilt University, summa cum laude, in 2010
  - Two year full-tuition merit-based scholarship (McMinn Honor Scholarship) for natural science majors
- Ph.D. in Physics, from Massachusetts Institute of Technology, in 2017
- Post-doc for Peking University, starting in 2018
- ATLAS Collaboration member, summer 2008, Research Experience for Undergraduates (REU), at Indiana University
- CMS Collaboration member, 2011 – 2017 and 2018 - ?
  - CMS Achievement award in 2013
  - Speaker for CERN Collider Cross-talk in 2014
  - Delivered internal CMS approval talk for the Run 1 $W^\pm W^\pm$ scattering analysis

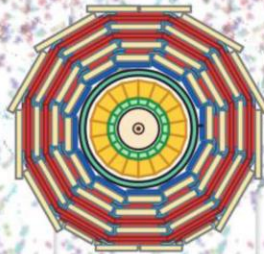*The Compact Muon Solenoid Collaboration*
confers on

Andrew Levin (MIT)

the

CMS 2013 Achievement Award

for

his work to develop the implementation of flexible geometry in the CMSSW fast simulation framework.

*The Collaboration Board Chairperson*
(Ian Shipsey)

The Experiment Spokesperson
(Joseph Incandela)

....

...

December 9th, 2013

Previous Work and Achievements – Physics

- Observation of electroweak-induced $W^{\pm}W^{\pm}jj$ production with the CMS experiment
  - Search performed with the 36 fb^{-1} of data CMS collected in 2016
  - Used fully leptonic final state ($l = e$ or μ)
  - Obtained a 5.5 σ observed significance using 2D m_{jj} - m_{ll} fit + simultaneous 1D m_{jj} fit of a control region
  - This is the world's first observation of electroweak-induced VVjj production at a pp collider
  - This topic is important because electroweak-induced $W^{\pm}W^{\pm}jj$ production includes WW scattering, which is unitarized by the Higgs boson in the SM
  - Published in [PRL](#), reported about in [CERN news website](#) and [MIT news website](#)
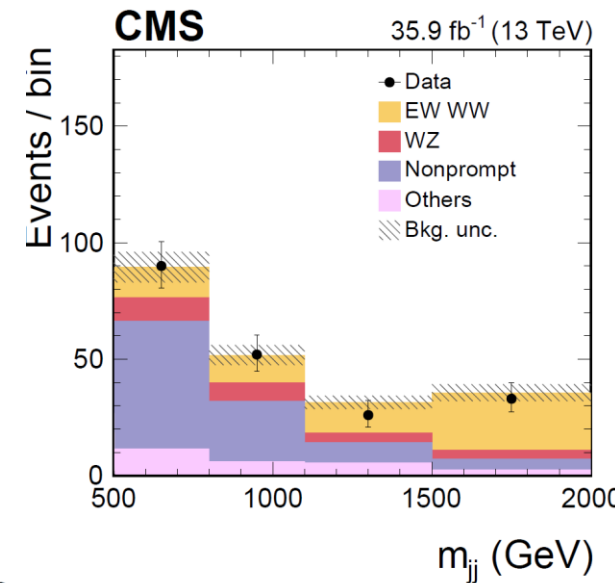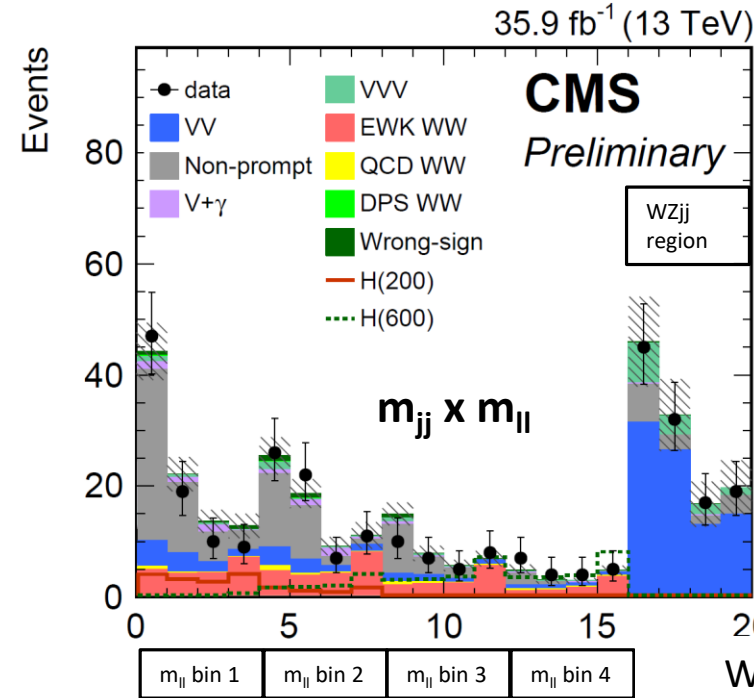
$W^{\pm}W^{\pm} \rightarrow W^{\pm}W^{\pm}$ xs versus $\sqrt{s}$*
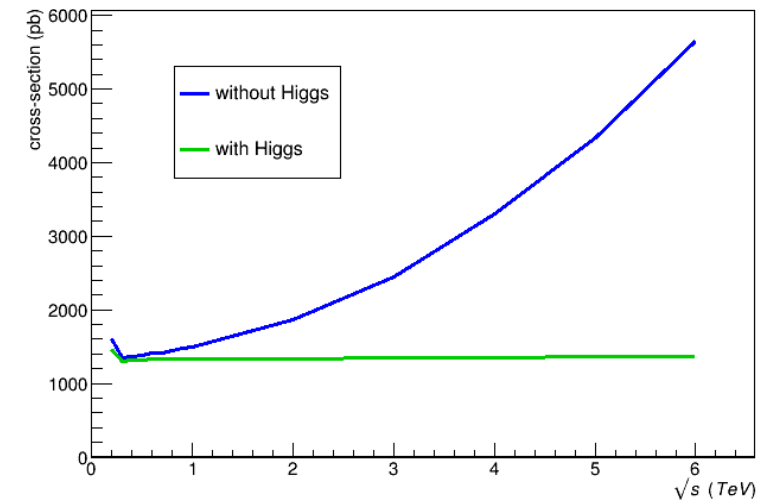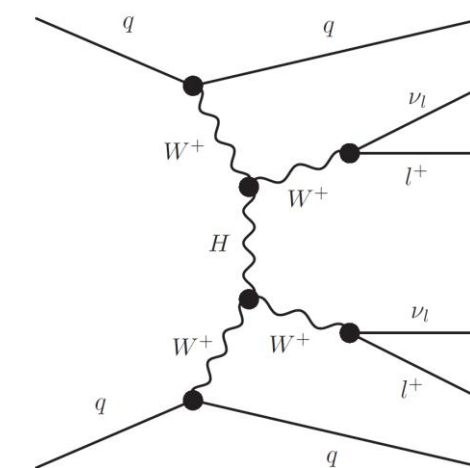
CERN COURIER

Latest Issue | **Archive** | Jobs | Links | Buyer's guide | White papers | Events | Contact us
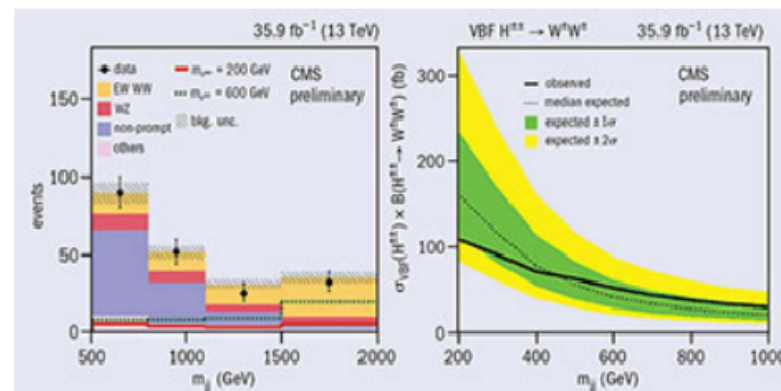
Search [ ] Go

SHARE THIS

✉ E-mail to a friend
⒮ StumbleUpon
🐦 Twitter

CERN COURIER

Jul 10, 2017

CMS observes production of same-sign W-boson pairs

Dijet mass distribution and confidence-level upper limits

The LHC was built with a guaranteed discovery: the ATLAS and CMS experiments would either find a Higgs boson, or it would discover new physics in vector boson scattering (VBS) at high energies. The discovery of a Higgs-like boson in July 2012 confirmed that the W and Z bosons acquire mass through the Higgs mechanism, but to determine whether the observed particle corresponds to the single Higgs boson expected in the Standard Model (SM), it is now paramount to precisely measure the Higgs boson's contributions to VBS. Since the behaviour of

Previous Work and Achievements – Service

- CMS uses a globally distributed computing system, with so-called Tier 0, 1, 2, and 3 sites around the world

- We use these resources to process raw data and to simulate raw data

- High level of parallelization possible, so we use workflows containing several steps of many copies of the same job run on different input events

- I was responsible for running release validation workflows for the CMS Collaboration between 2013 and 2017

- These are time-critical workflows needed to test new releases of CMS software

- I developed a web-server based automatic system to replace an e-mail based manual system

Number of running jobs at Fermilab Tier 1

Number of pending jobs at Fermilab Tier 1
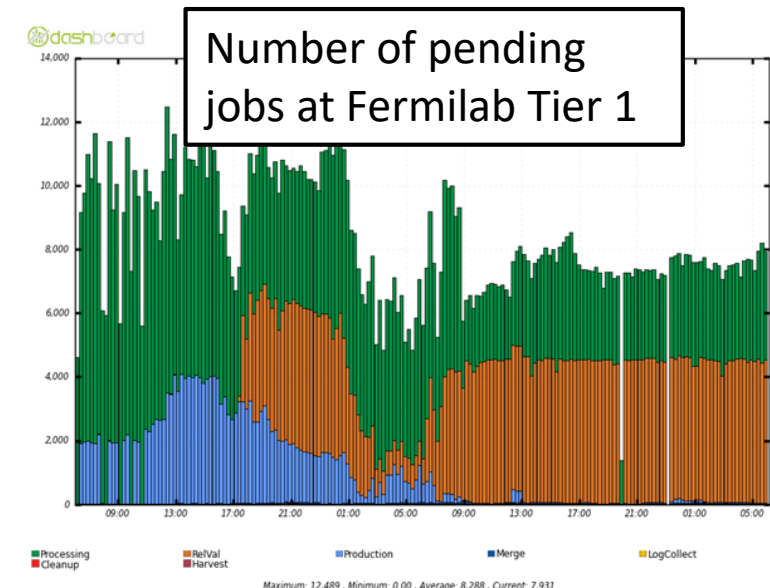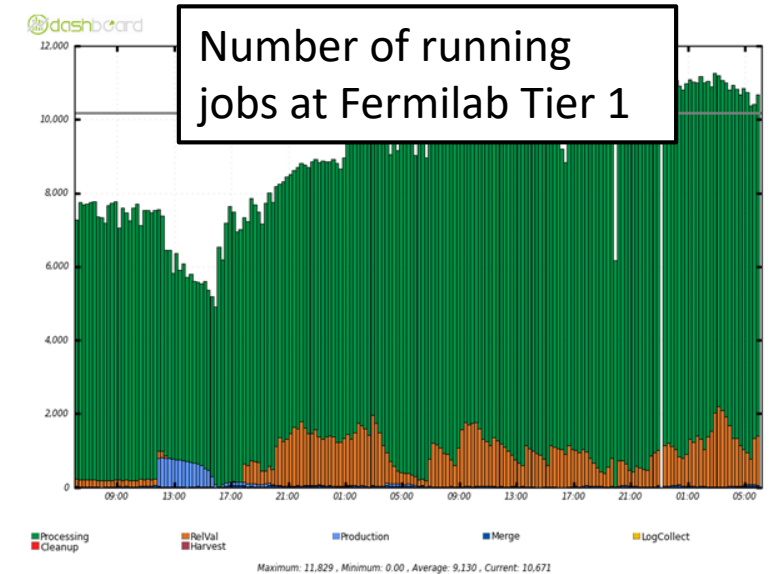
Working Plan

- Standard Model multi-boson studies
  - Help Peking University graduate students with their ongoing $W\gamma$ and $Z\gamma$ scattering analyses
  - $W\gamma$ and $Z\gamma$ scattering analyses are similar to the $W^\pm W^\pm$ scattering, but require estimation of the background due to non-prompt ("fake") photons using data-driven methods
  - Update electroweak-induced $W^\pm W^\pm jj$ analysis with more data
  - Combination of vector boson scattering channels
  - Studies of longitudinally polarized vector boson scattering (important for Higgs unitarization)
- Gas Electron Multiplier (GEM) muon detector
  - Will be added to $1.6 < |\eta| < 2.4$ region during the long LHC shutdown in 2019-2020
  - To maintain position and timing resolution in high luminosity environment
  - Large sub-collaboration for construction, testing, and installation
  - Peking University's CMS group (Prof. Ban) has long history of contributions to CMS muon systems
  - Peking University laboratories have been set up for GEM module production and testing