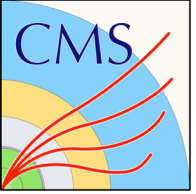

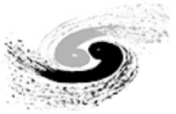

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Work process

Student: Jialin guo

Supervisor : Mingshui Chen

CMS

2022.5-2022.8

outline

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- **Analysis**
  - ➢Search for high mass Higgs(500-3000GeV) in HZZ2L2Q final state with Full RunII Data
  - ➢Search for aTGC in Semileptonic WV and ZV channels
- **Hardware**
  - ➢CSC Doc shift

HZZ2L2Q Analysis

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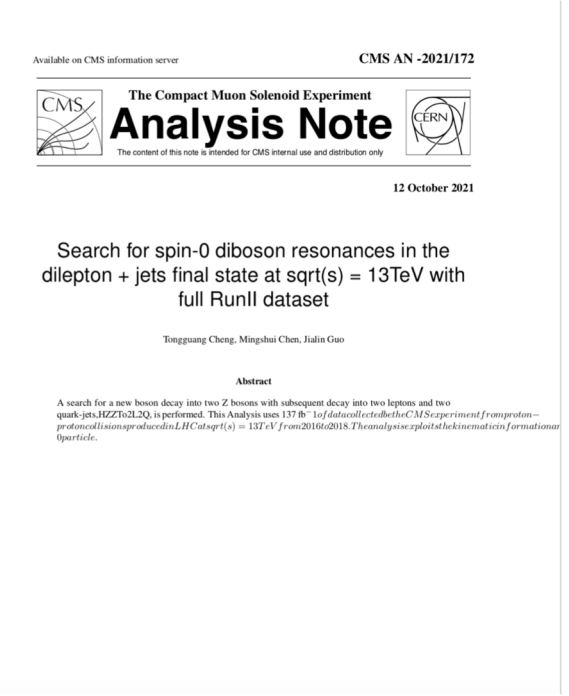
- **Status**
  - Almost go through all the steps with UL datasets
  - Preliminary Limit result

- **Plan**
  - Finish AN-note(AN-21-172)
  - For resolved case, we will replace DeepCSV by DeepJet for b-tag
  - Uncertainty study


Available on CMS information server CMS AN -2021/172

The Compact Muon Solenoid Experiment

Analysis Note

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

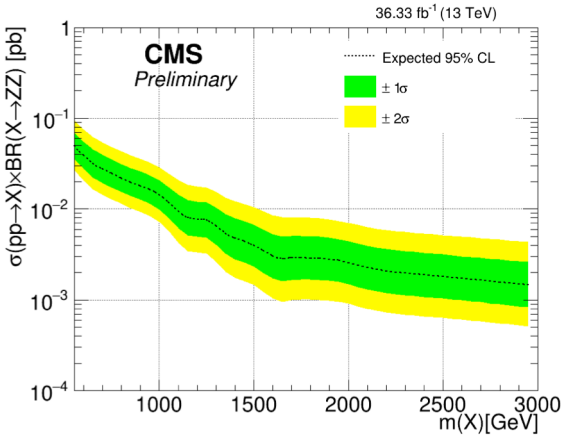
12 October 2021

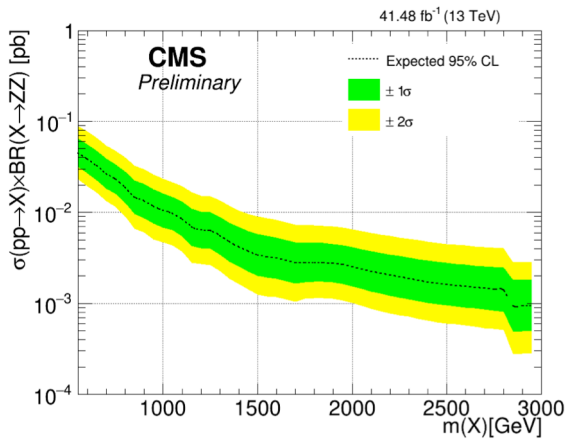
Search for spin-0 diboson resonances in the dilepton + jets final state at sqrt(s) = 13TeV with full RunII dataset

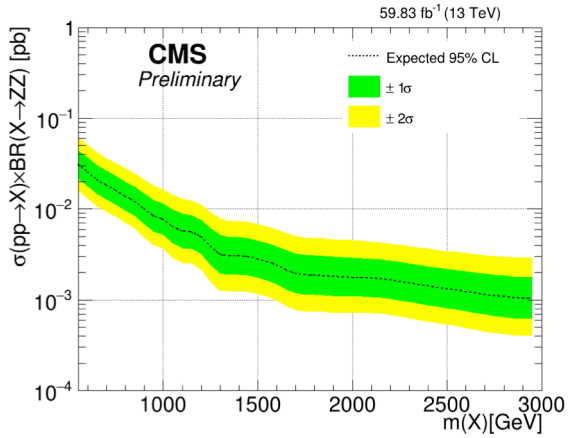
Tongguang Cheng, Mingshui Chen, Jialin Guo

Abstract

A search for a new boson decay into two Z bosons with subsequent decay into two leptons and two quark-jets,HZZTo2L2Q, is performed. This Analysis uses 137 fb^{-1} of data collected by the CMS experiment from proton–proton collisions produced in LHC at sqrt(s) = 13TeV from 2016 to 2018. The analysis exploits the kinematic informational 0particle.







aTGC Analysis

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Effective field theory(EFT): the natural way to extend the standard model

- Satisfy the S-matrix axioms of unitary, symmetries of the standard model(SM)
- Recover the standard model $\Lambda \gg m, \mathcal{L}_{eff} \rightarrow \mathcal{L}_{SM}$
- General enough to capture any physics beyond the standard model

Theoretical Description

$$\mathcal{L}_{eff} = \mathcal{L}_{SM} + \sum_i \frac{c_i}{\Lambda^2}\mathcal{O}_i + \cdots$$
$$= \mathcal{L}_{SM} + \frac{c_{www}}{\Lambda^2}\mathcal{O}_{www} + \frac{c_w}{\Lambda^2}\mathcal{O}_w + \frac{c_B}{\Lambda^2}\mathcal{O}_B$$

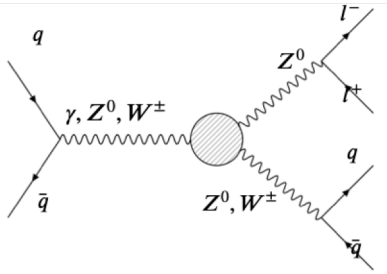
Where:

$$\mathcal{O}_{www} = Tr\left[W_{uv}W^{v\rho}W^{u}_{\rho}\right], \mathcal{O}_w = (D_u\phi)^\dagger W^{v\rho}(D_v\phi), \mathcal{O}_B = (D_u\phi)^\dagger B^{v\rho}(D_v\phi)$$

Lead to:

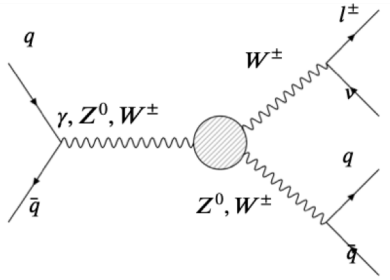
$$\frac{c_w}{\Lambda^2} = \frac{2}{M_Z^2}\left(tan^2\theta_w\Delta\kappa_\gamma + \Delta\kappa_z\right), \frac{c_B}{\Lambda^2} = \frac{2}{M_Z^2}\left(\Delta\kappa_\gamma - \Delta\kappa_z\right)$$

ZV Channel



IHEP
★First analysis with ZV semi-leptonic

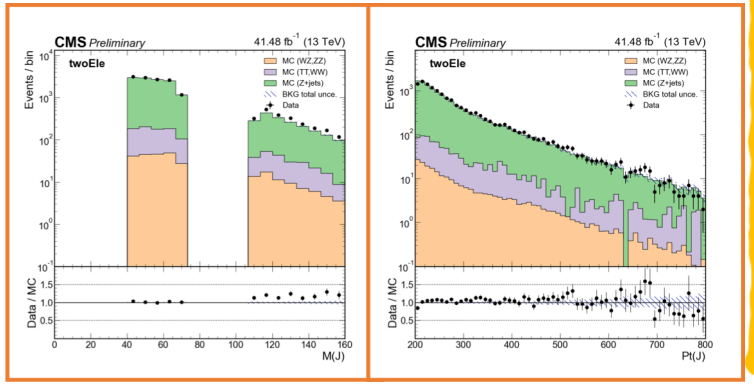
WV Channel



University Of Hamburg

Status

- Framewok ready for ZV final state
- Datasets produce & basic event selections
- Preliminary Data MC looks fine



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The Compact Muon Solenoid Experiment

Analysis Note

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12 July 2022

Search for aT(N)GC in Semileptonic WV and ZV channels

Mingshui Chen, Tongguang Cheng, Jialin Guo, Andreas Hinzmann, Ankita Mehta, Vukasin Milosevic, Ram Krishna Sharma

CSC DOC Shift

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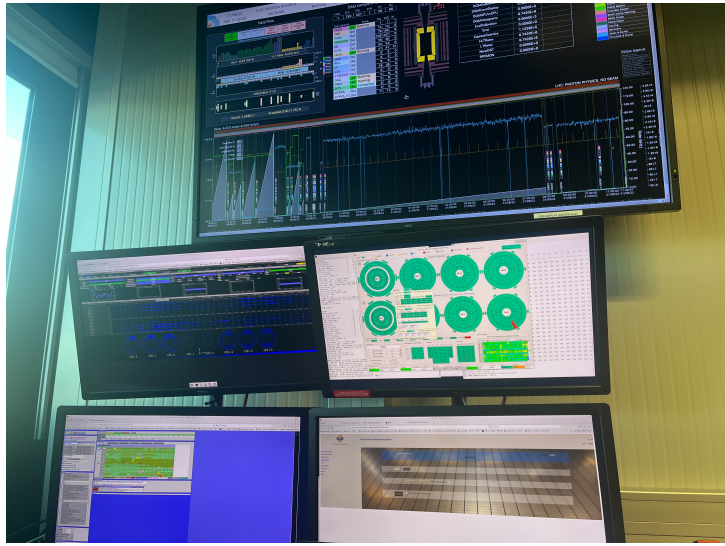
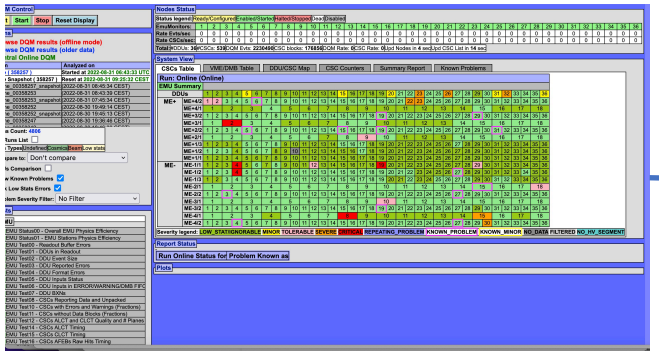
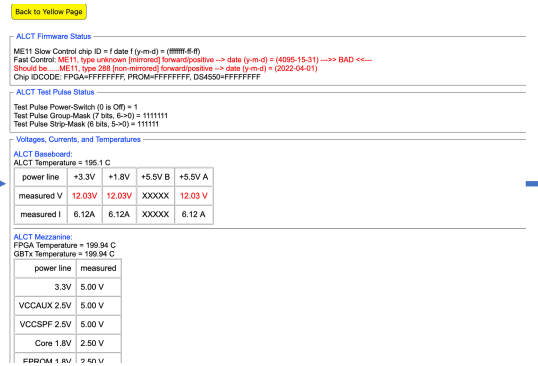
- Monitor running state of CSC
- Daily health check for system
- Check and Report issues
- Help expert to solve problem



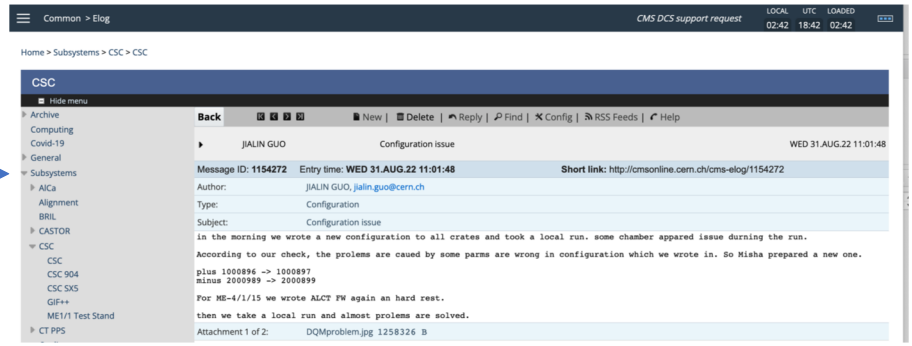
Issue comes up

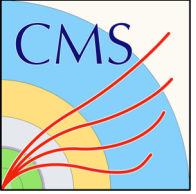


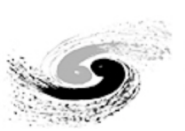
Check



Report, help solve and log







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Thanks