

KSETA-Arbeitsbericht 2016

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Work in CMS

Setting limits on triple gauge couplings

The topic of my thesis is setting limits on anomalous triple gauge couplings in WW/WZ in the CMS experiment at the LHC at $\sqrt{s} = 13 \text{ TeV}$. The idea of the analysis is based on the effective field theory approach which is one of the ways for searching for the new physics. The effective field theory adds higher dimensional operators to the Standard Model Lagrangian. In this analysis we focus only on dimension 6 operators that don't violate CP-symmetry. The analysis is performed in the semileptonic channel which profits from high branching fraction and full kinematic reconstruction. The search is restricted to the case when hadronically decaying W -boson or Z -boson is boosted. This means that $W(Z)$ -boson is reconstructed not as 2 jets coming from 2 quarks but as a single jet. Jet-substructure techniques are used for identification of these jets.

During 2016 the analysis with data recorded by the CMS experiment in 2015 was completed and approved by the CMS collaboration. The results of the analysis have become public in August 2016 and were shown at the QCD@LHC conference in Zürich.

Work for Egamma group in CMS

During 2016 I was working on several things in Egamma group in CMS:

- integration of PUPPI-based isolation for electrons into the miniAOD format
- integration of the isolation computed by Common Isolation Tool-kit (CITK) to the photon object which is stored in the standard format used in the CMS

Data acquisition shifts in CMS

Until July 2016 I was based at CERN and I was doing DAQ shifts on a regular base. The work basically consisted of: monitoring Data Acquisition of CMS for 8 hours at CMS (Point 5 of LHC), starting/stopping runs, diagnosing the Data Acquisition system, configuring the system if conditions are changed.

Conferences, workshops

I have participated in the following conferences and workshops during 2016:

- Talk at Graduiertenkolleg workshop in Freudenstadt, 26th - 28th of September 2016, "*Search for anomalous couplings in semileptonic WW and WZ decays in the CMS experiment*".
- Talk at QCD@LHC Conference, Zürich, 22nd - 26th of August 2016, "*Multiboson production and vector boson scattering measurements in CMS*", Hard QCD+Electroweak session.
- Talk at Deutsche Physikalische Gesellschaft Conference, Hamburg, 29th of February - 4th of March 2016, "*Limits on anomalous triple gauge couplings at $\sqrt{s}=13$ TeV in the CMS experiment*".
- Poster at the 3rd KSETA Plenary Workshop 2016, Durbach, 22nd - 24th February 2016 "*Limits on anomalous triple gauge coupling at $\sqrt{s}=13$ TeV in the CMS experiment*".

Publications

CMS Collaboration, "*Search for anomalous couplings in semileptonic WW and WZ decays at $\sqrt{s} = 13$ TeV*", CMS PAS SMP-16-012.