T 33: Suche nach neuen Teilchen 2

Zeit: Dienstag 11:00–12:15 Raum: JUR 2

T 33.1 Di 11:00 JUR 2

Identification of boosted Higgs bosons in the search for their pair-production in final states with four b quarks with the ATLAS detector at $\sqrt{s}$=13 TeV using 36 fb^{-1} of data — •Merve Sahinsoy and Oleg Brandt — Kirchhoff Institute for Physics, University of Heidelberg

The Higgs sector is one of the least explored regions of the Standard Model (SM) and therefore of high importance in the search for new physics. Many new physics models predict rates of Higgs boson pair-production that are significantly higher than the SM rate. Using 36 fb^{-1} of data collected by ATLAS detector in 2015 and 2016, this analysis searches for Higgs boson pair-production with two bb$^-$ pairs in the final state. The focus of this analysis is the boosted kinematic regime defined by large transverse momenta of the Higgs boson, which aims at fully exploiting the kinematic regime made accessible by the increased centre-of-mass energy in Run II of the LHC. In this extreme kinematic regime, the two b-quark jets from a Higgs boson decay are merged into one large-radius jet. Boosted Higgs boson tagging techniques to separate signal from background are presented in the context of this search, and the impact of recent improvements on the sensitivity of the analysis is discussed.

T 33.2 Di 11:15 JUR 2

Search for high mass resonances decaying into a pair of Higgs bosons in the bb$\tau\tau$ fully-hadronic final state with 36.2 fb^{-1} at $\sqrt{s}$ = 13 TeV — •Matteo Defranchis[1], Camilla Galloni[2], Pietro Govoni[3], Nhan Tran[4], and Caterina Verinieri[4] — [1]DESY, Hamburg, Germnay — [2]University of Zurich, Zurich, Switzerland — [3]INFN and University of Milano-Bicocca, Milan, Italy — [4]Fermi National Accelerator Laboratory, Batavia, Illinois

A model independent search for narrow high-mass resonances decaying into a pair of Higgs bosons in the bb$\tau\tau$ fully-hadronic final state is presented. The analysis is performed using proton-proton collisions data at $\sqrt{s}$ = 13 TeV collected by the CMS detector during 2016 data taking, which correspond to an integrated luminosity of 36.2 fb^{-1}. Dedicated reconstruction algorithms are exploited in order to identify the decay products of boosted Higgs bosons with high efficiency. Expected upper limits on the production cross section as a function of the resonance mass are estimated on the basis of Monte Carlo simulations and are found to be competitive with the ones obtained by similar searches.

T 33.3 Di 11:30 JUR 2

Large Extra Dimension Searches with the CMS Experiment — •Markus Radziej, Thomas Hebbeker, Arnd Meyer, and Tobias Pook — RWTH Aachen, III. Phys. Inst. A

With the Higgs Boson discovery at a mass of 125 GeV, the hierarchy problem becomes a pressing issue. One of the most prominent, potential solutions is the addition of extra spatial dimensions. A particularly interesting model has been suggested by Arkani-Hamed, Dimopoulos and Dvali, allowing for non-resonant excesses in the dilepton mass spectra at high energies.

Topic of the presented analysis is the dimuon final state. The results are based on the data recorded by the CMS experiment during 2016 at a center-of-mass energy of $\sqrt{s} = 13$ TeV.

T 33.4 Di 11:45 JUR 2

Search for heavy diboson resonances decaying to $W \to \ell\nu$ and $h \to \tau\tau$ with CMS — •Thomas Esch, Thomas Hebbeker, Kerstin Hoepfner, and Swagata Mukherjee — III. Physikalisches Institut A, RWTH Aachen, Germany

Heavy resonances that decay to two bosons could be an interesting signature for new physics. With increasing resonance masses, the two bosons get higher momenta and their decay products get closer to each other.

In this talk, the analysis for a search for heavy charged Wh resonances with the full CMS dataset of 2016 for the case where the W boson decays leptonically and the h boson decays to τ leptons will be presented. It will concentrate on semileptonic and fully hadronic $h \to \tau\tau$ decays and the reconstruction techniques for nearby τ decay products.

T 33.5 Di 12:00 JUR 2

First 13 TeV search for new heavy spin-0 resonances decaying into top quarks at CMS — •Afiq Anuar, Kelly Beernaert, Alexander Grohsjean, Christian Schwanenberger, and Gerrit Van Onsem — Deutsches Elektronen Synchrotron (DESY), Notkestrasse 85, D-22607 Hamburg

Many beyond the Standard Model (SM) theories include an extended Higgs sector. Being the most massive particle in the SM, the top quark is of primary interest as the main probe with which these theories can be subjected to experimental scrutiny. Here a search for a heavy spin-0 resonance decaying into a top quark pair in the dilepton channel where both W bosons from the top decays decay leptonically is presented. The search is performed using data taken by the CMS experiment in 2016 at 13 TeV. Both the pseudoscalar A and scalar H scenarios, including their interference effects with SM top pair production process are taken into account. The search exploits simultaneously the peak-dip structure of the top pair mass spectrum and spin correlation observables for improved sensitivity.