T 87: Higgs physics IX (Charm and Tau Final States)

Time: Friday 9:00–10:15 Location: ZHG104

T 87.1 Fri 9:00 ZHG104

NLO QCD Corrections to ZH Production via Gluon Fusion — •Dominik Grau[1], Matthias Steinhauser[1], Marco Vitti[1], Joshua Davies[2], and Kay Schönwald[3] — [1]Karlsruhe Institute of Technology , Karlsruhe, Germany — [2]The University of Liverpool, Liverpool, United Kingdom — [3]Universität Zürich, Zürich, Switzerland

The associated production of a Higgs boson with a vector boson is an important process investigated at the LHC. Formally the gluon fusion channel enters the process pp→ZH at NNLO. However, it gives sizeable contributions to the cross section and to the theoretical uncertainties which motivates the computation of NLO QCD corrections to gg→ZH. In this talk we describe an approach to obtain analytic results for the two-loop virtual corrections as an expansion around the forward limit. We show that the combination of these results with analytic high-energy expansions can cover the whole phase-space without the need of time-consuming numerical methods.

T 87.2 Fri 9:15 ZHG104

Current developments in the search for the Higgs boson decay to a charm-anticharm pair in vector boson associated production mode at CMS in Run 3 — •Valentyn Vaulin[1], Alexander Schmidt[1], Andrey Pozdnyakov[1], Jan Schulz[1], Gaetano Barone[2], Spandan Mondal[2], Trevor Russell[2], Ulrich Heintz[2], Licheng Zhang[3], Chris Palmer[3], and Braden Kronheim[3] — [1]RWTH Aachen University, Germany — [2]Brown University, USA — [3]University of Maryland, College Park, USA

During the recent years multiple analysis techniques to measure the Higgs boson coupling to charm quarks using the full Run-2 data of the CMS experiment have been established. The Higgs boson decay into a charm-anticharm pair, where the Higgs boson is produced in association with the W or Z boson, is expected to be the most sensitive channel. In this talk developments of the VH(cc) analysis, using Run-3 data at CMS, are presented. In particular, the analysis strategy and the first expected limits will be shown.

T 87.3 Fri 9:30 ZHG104

PAIReD jets in CMS: Recent developments of a novel jet tagging approach for H(cc) and H(bb) searches in the CMS experiment — Gaetano Barone[1], Alexander Jung[2], Ming-Yan Lee[2], Spandan Mondal[1], Trevor Russel[1], Uttiya Sarkar[2], Alexander Schmidt[2], •Jan Schulz[2], and Ulrich Willemsen[2] — [1]Brown University, Providence, USA — [2]III. Physikalisches Institut A, RWTH Aachen University, Germany

The identification of jet flavors based on machine learning is the most critical ingredient for the search for rare Higgs decays in two charm quarks. For the upcoming CMS analysis, a new jet tagging strategy has been developed that outperforms classical tagging approaches, especially for small Lorentz boosts of the Higgs boson. The central element of this new method is the so-called PAIReD jet, a new unconventional jet type which, in contrast to traditional AK4 jets, exploits correlations between the two charm jets. This talk will give an overview of the PAIReD approach and recent developments such as mass-decorrelated training and simultaneous jet-mass regression.

T 87.4 Fri 9:45 ZHG104

Search for the Higgs plus charm quark production mode in the $H \to WW \to e\nu\mu\nu$ channel — •Ming-Yan Lee, Alexander Schmidt, Andrey Pozdnyakov, Uttiya Sarkar, and Valentyn Vaulin — III. Physikalisches Institut A, RWTH Aachen University, Aachen, Germany

The Higgs plus charm production mode is another topology to probe the Higgs-charm Yukawa coupling complementary to H→cc channels. This topology provides the possibility to access the Higgs-charm coupling via cleaner final states. In this analysis, we aim to consider the Higgs decay into W boson to dileptonic final states with additional charm-tagged jets. The upper limit to extract H-c coupling is demonstrated using the data-taking period 2016 to 2018 of the CMS experiment at the LHC at $\sqrt{s}$ =13 TeV.

T 87.5 Fri 10:00 ZHG104

Performance of tau reconstruction with CMS — Markus Klute, Olha Lavoryk, Artur Monsch, •Jan Voss, and Roger Wolf — Institut für Experimentelle Teilchenphysik, Geb. 30.23 Wolfgang-Gaede- Str. 1 76131 Karlsruhe

The precise measurements of tau-leptons play an important part in many analyses, especially in Higgs physics. For higher precision, the use of scale factors is widespread to correct for mismodelings of the data with simulations or data driven techniques. This talk will cover the measurement of the DeepTau ID scale factors in different quantities like transverse momentum, decaymode and energy scale, as well as its technical intricacies.