

T 49: Eingeladene Vorträge (Invited Topical Talks) III

Time: Wednesday 14:00–15:30

Location: Tc

Invited Topical Talk

T 49.1 Wed 14:00 Tc

A walk through $H \rightarrow \tau\tau$ in the CMS experiment — ●HALE SERT — RWTH Aachen University, Experimental Physics Institute 3B, Aachen, Germany

The direct coupling of Higgs bosons to fermions is the necessary probe to understand the mass generation of the fermions. The tau lepton decay of the Higgs boson, with the second largest branching ratio, was the first one observed in combination of the CMS and ATLAS data collected at $\sqrt{s}=7$ TeV and $\sqrt{s}=8$ TeV. The first observation by the CMS experiment was achieved after inclusion of the 2016 data with $\mathcal{L}=35.9\text{ fb}^{-1}$ at $\sqrt{s}=13$ TeV. Since then, $H \rightarrow \tau\tau$ has been observed in various production modes. Cross sections, the signal strength μ , defined as the ratio of the observed cross section to the Standard Model expectation, and the couplings to bosons and fermions, κ_v and κ_f , have been determined, and found in agreement with the predictions of the Standard Model. This decay has been recently used to investigate the CP structure in the Yukawa coupling. In parallel, the heavier Higgs bosons decaying in tau leptons have been searched in several channels. This talk will guide you through the progress from the discovery of $H \rightarrow \tau\tau$ to up-to-date results obtained in Run 2 data with $\mathcal{L}=137\text{ fb}^{-1}$ collected at $\sqrt{s}=13$ TeV in the CMS experiment.

Invited Topical Talk

T 49.2 Wed 14:30 Tc

Looking inside jets - jet substructure techniques and their application in ATLAS — ●CHRIS MALENA DELITZSCH — University of Arizona, Tucson, USA

The unprecedented center-of-mass energy of the proton-proton collisions at the Large Hadron Collider enables the production of hadronically decaying particles such as W/Z/H bosons and top quarks with a transverse momentum much larger than their rest mass, resulting in the collimation of their decay products. To enhance the sensitivity to new physics and the precision of Standard Model measurements at high transverse momenta, many different jet substructure techniques have been developed and established over the past years that take advantage of the different radiation patterns within the jet depending on the initiating particle. This talk describes the state of the art substructure and tagging techniques and their applications in physics analyses in ATLAS and highlights the challenges of the jet substructure field.

Invited Topical Talk

T 49.3 Wed 15:00 Tc

Real-time track reconstruction with GPUs — ●DOROTHEA VOM BRUCH — Aix Marseille Univ, CNRS/IN2P3, CPPM, Marseille, France

As the instantaneous luminosity of high energy physics (HEP) experiments increases, so does the data rate produced. To process these data streams in real time, available computing hardware has to be exploited optimally. In addition, increasingly more global event information is needed for efficient data selection, such as the reconstruction of charged particle trajectories at the earliest possible stages of the selection chain. I will discuss how the multi-core architecture of graphics processing units (GPUs) is used in several HEP experiments to cope with the computing challenge of particle reconstruction in real-time.