

T 51: Invited Overview Talks 4

Time: Wednesday 9:00–10:30

Location: Geb. 30.95: Audimax

Invited Overview Talk T 51.1 Wed 9:00 Geb. 30.95: Audimax

The top quark: a precision probe and a window to new phenomena — ●JAN KIESELER — KIT, Karlsruhe, Germany

The top quark is one of the most interesting particles in the Standard Model of particle physics. Its mass exceeds those of all other fundamental particles, which implies a unique relationship with the Higgs Boson and makes it a possible portal to physics beyond the Standard Model. At the same time, its short lifetime allows probing its bare properties before hadronisation and it offers sensitivity to a variety of Standard-Model parameters through comparison to precision calculations. This talk will cover recent advances in the understanding of the top quark and its relation to other fundamental particles as well as give a flavour of what is yet to come in the next years.

Invited Overview Talk T 51.2 Wed 9:30 Geb. 30.95: Audimax

Fundamental tests of the Standard Model at ATLAS and CMS — ●BAPTISTE RAVINA — Georg-August-Universität Göttingen

The remarkable performance of the Large Hadron Collider (LHC), and of the ATLAS and CMS experiments during Run 1 and Run 2 of the LHC, has opened the door to new fundamental tests of the Standard Model. Detailed knowledge of the detectors during Run 1 allows for high-precision measurements of the W^\pm and Z bosons, while the large Run 2 dataset has revealed further rare electroweak processes.

This talk will highlight some of the successes of the ATLAS and CMS collaborations over the past year, in targeting fundamental aspects of Standard Model physics. Amongst the topics that will be covered are recent measurements of the mass, width and cross sections of the W^\pm and Z bosons; the observation of the elusive, fully electroweak $W^\pm W^\pm$

production process; extractions of α_S using very different techniques; and a characterisation of jet and tau production mechanisms. A novel field of research, that of quantum information with high-energy fundamental particles, will be introduced with the observation of quantum entanglement in pairs of top quarks.

Invited Overview Talk T 51.3 Wed 10:00 Geb. 30.95: Audimax

Mastering challenges of High-Luminosity LHC data with innovative computing solutions — ●MICHAEL BOEHLER — Albert-Ludwigs-Universität, Freiburg, Germany

The Worldwide LHC Computing Grid was founded in 2004 to store, distribute, and analyse the huge amounts of data of the LHC experiments. It combines the computing and storage resources of over 170 compute centres in more than 40 countries. Around 10 of these centres are located in Germany. The current data volume of 200 petabytes per year will increase to exabytes per year with the launch of the High-Luminosity LHC in 2029. The demand for computing resources will also increase dramatically unless drastic savings are achieved through aggressive research and development in the area of data processing. In addition, the sharp increase in energy prices in the last year and the general consensus on energy conservation require sustainable computing solutions.

A selection of tools, further developments, and innovative ideas will be presented that are essential for overcoming these challenges. Important building blocks for this task are applications that make it possible to integrate heterogeneous resources transparently and dynamically into existing high-energy physics workflows. The accounting ecosystem AUDITOR and the meta-scheduler CobalD/TARDIS, which were developed in Germany in the FIDIUM project, make it possible to break new ground.