T 107: Invited Overview Talks V

Time: Friday 11:00–12:30

Location: AudiMax

Invited Overview Talk T 107.1 Fri 11:00 AudiMax
Beyond the Main Detectors: An Overview of Smaller Experiments at the LHC — ●Felix Kling — Universität Bonn, 53113 Bonn, Germany

While the Large Hadron Collider (LHC) is best known for its large multipurpose experiments — ATLAS, CMS, LHCb, and ALICE — it also hosts a diverse set of smaller experiments that complement its physics program. These include LHCf and TOTEM, which focus on forward QCD measurements and hadronic interactions; FASER and SND@LHC, which perform neutrino measurements and search for physics beyond the Standard Model; as well as MilliQan and MoEDAL, designed to search for particles with anomalous electromagnetic charges. In this talk, I will provide an overview of these smaller LHC experiments and present their recent results. I will also discuss ongoing and proposed initiatives for additional small experiments during the remaining LHC running and at future collider facilities.

Invited Overview Talk T 107.2 Fri 11:30 AudiMax
Pimp my ride: Overhauling the ATLAS and CMS experiments to ride the High Luminosity Highway at the LHC — ●Stefan Maier — Karlsruhe Institute of Technology, Germany

The upcoming high-luminosity upgrade of the Large Hadron Collider (HL-LHC) will provide a unique opportunity to significantly extend the physics research program of the general-purpose experiments ATLAS and CMS. With its harsh environment, operation at the HL-LHC will bring experimental and instrumental challenges such as increased radiation levels and particle collisions per bunch crossing. In order

to fully exploit the physics potential, the ATLAS and CMS collaborations are upgrading their detector systems—both physically and conceptually. These versatile improvements are summarized in the Phase-2 Upgrades. While some subsystems will be partially enhanced with new electronics, others, such as the tracking systems, will be fully replaced or will complement the current detector systems, like the new timing layers.

This talk rides you through the detector upgrades of both experiments and highlights a selection of subdetector systems that do not just get a new paint job but pursue novel detection and readout concepts.

Invited Overview Talk T 107.3 Fri 12:00 AudiMax
Overview of the solar model and LUNANOVA — ●Daniel Bemmerer — Helmholtz-Zentrum Dresden-Rossendorf (HZDR)

The standard solar model describes the physics of the solar interior. Input parameters include the solar elemental composition, the total energy radiated from the sun, and microphysics such as nuclear reactions and radiation transport. The model can be validated observing the fluxes of neutrinos produced in the solar core and the sound waves at the solar surface. There were two main challenges to the model. First, the solar neutrino problem, which was solved by the discovery of neutrino flavour oscillations. Second, the solar abundance puzzle, caused by discrepant data on the solar composition. In order to solve this puzzle, we will build a new laboratory, LUNANOVA, and measure the rates of several neutrino-producing reactions in the sun. The new data will break the degeneracy between abundances and radiation transport, enable to use the sun as a calibrated particle source, and decisively improve the models of solar-like stars in general.