

The CMS Outer Tracker Phase II Upgrade Project at NCP



Speaker: Dr. Ashfaq Ahmad
Host: Dr. Mingshui Chen
Time: Aug. 6, Tuesday, 14:00
Location: Multidisciplinary building 122
Indico: <https://indico.ihep.ac.cn/event/23119/>
Zoom: <https://us02web.zoom.us/j/85072671910?pwd=HlExktpZjrBhq6FSL54OLXYzIqVXIh.1>
Password: 231844

Abstract:

The High Luminosity LHC upgrade (HL-LHC), scheduled for 2026–2028, aims to enhance the physics potential for probing Standard Model (SM) processes and exploring physics beyond the Standard Model (BSM). As part of the HL-LHC upgrade program, the CMS experiment is preparing for significant upgrades to its sub-detectors, notably replacing the current Tracker with a new Silicon tracking system divided into the Outer Tracker and the Inner Tracker. The Outer Tracker will introduce two novel module types, 2S and PS, employing an innovative transverse momentum (p_T) discrimination concept. This talk will outline the physics motivations and anticipated performance of the CMS Phase-2 upgrade. In the context of particle tracking, the concept of silicon p_T modules will be explained briefly.

The semiconductor detector laboratory established at NCP will be introduced, detailing its role in silicon sensor qualification, module assembly, metrology, and testing. NCP is one of six designated silicon qualification centers for CMS, one of eight centers for silicon module assembly and testing, and uniquely serves as the sole CMS facility constructing TB2S Al-CF ladders. The talk will highlight the progress achieved at NCP across all facets of the CMS Tracker Phase-2 upgrade

About the speaker:

Dr. Ashfaq Ahmad completed his PhD in Experimental High Energy Physics on the Atlas experiment at the University of Freiburg in Germany in 2004. Following his PhD, he worked on the Atlas experiment as a postdoc fellow employed by Academia Sinica Taiwan for three years. From early 2007 until September 2012, he served as a postdoctoral research scientist at Stony Brook University, USA. Since October 2012, he has been actively involved in the CMS experiment at NCP/Islamabad and was appointed as Director of the Experimental High Energy Physics Department in 2014. In 2019, Dr. Ashfaq was awarded the Distinguished Service Medal (along with a cash prize). He has held significant roles within the CMS collaboration, including Convener of the CMS Single Top Quark Physics Group and member of the CMS Conference. Currently, he serves as a member of the CMS Theses Committee, the CMS Silicon Sensor Expert Panel, the CMS CB Advisory Group, and the CMS Tracker Upgrade Steering Group. He also served as the Convener of the Electron/Photon Calibration Group during the Higgs discovery era on the Atlas experiment.