

## **INSTRUMENTATION OF PHYSICS IN DETECTOR LABORATORY**

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Helsinki Detector Laboratory is a national infrastructure specialized in the instrumentation of particle and nuclear physics. It is a joint laboratory between Helsinki Institute of Physics (HIP) and the Department of Physics of the University of Helsinki (UH/Physics), especially UH Division of Particle and Astrophysics (PAP). The Laboratory provides premises, equipment, know-how and technical support for research projects developing detector technologies. The Laboratory team has extensive expertise in the modelling, design, construction and testing of semiconductor and gas-filled radiation detectors. In addition, the personnel and scientists working in the Laboratory are active in educating the new generation of physicists.

All the projects present in Detector Laboratory have the objective to provide reliable instruments for large international physics experiments. The Laboratory is specialized in quality assurance of detectors and their components and in detector prototyping. The Laboratory hosts the activities of several experimental projects participating in the instrumentation of CMS, TOTEM and ALICE experiments at CERN, and NuSTAR experiment at FAIR. To maintain the outstanding expertise of the Laboratory, new detector technologies are actively developed in the framework of CERN CMS, RD50 and RD51 collaborations.

Together with the HIP CMS Upgrade Project, the Laboratory develops silicon pixel detectors for the future upgrades of CMS Tracker detector. With the HIP TOTEM Project, the Laboratory develops semiconductor detectors for the future TOTEM Upgrade and maintains the 40 GEM detectors previously manufactured in the Laboratory for the TOTEM T2 spectrometer. In the framework of HIP ALICE Project the Laboratory participates in the quality assurance of hundreds of square meters of GEM (Gaseous Electron Multiplier) foils needed for the upgrade of the ALICE TPC (Time Projection Chamber) detectors.

Together with the HIP FAIR Project, the Laboratory develops GEM-TPC detectors for the diagnostics of the future FAIR NuSTAR Super-FRS accelerator. In addition, together with STUK and Finnish industry, the Laboratory hosts a Fidipro-project related to nuclear safety, safeguards and security. Furthermore, the Laboratory hosts a project financed by the Finnish Funding Agency for Innovation (TEKES) for the development of black silicon photodiodes together with Aalto University Department of Electronics and Nanoengineering.