



PPD Seminar

PPD Summer Students' Seminar

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20 Aug 2025, 11:30

R61 CR03 (RAL)

Jason Ni/ATLAS: "Robustness studies of Graph-Based Track Seeding (GBTS) algorithm"

The High-Luminosity Large Hadron Collider (HL-LHC) will bring many challenges for particle track reconstruction due to greatly increased luminosity and pileup conditions. Many different tracking pipelines are currently under development for ATLAS. I will compare the performance of two of these pipelines, one of which uses the GBTS algorithm developed at RAL, with various kinds of simulated detector defects.

Bartosz Dlubak/CMS: "Exploring machine learning to reconstruct electron and photon energies in the CMS scouting data"

The scouting dataset collected by the CMS experiment in Run 3 offers a unique opportunity with electrons and photons. I will discuss the machine learning algorithms, namely boosted decision trees (BDTs) and deep learning architectures, that I used to predict the energies of the scouting electron and photon. The energy reconstruction algorithms utilised shower shape variables from the ECAL (electromagnetic calorimeter) energy deposit cluster, and the detector position where the hit was detected, along with additional tracker-specific data (for electrons only). The performance has been benchmarked against existing CMS-based BDT corrections.

Ruize Li/Dark Matter: "Glass-GEM simulations for the MIGDAL experiment using the Garf++ simulation package"

The Migdal In Galactic Dark mAtter expLoration (MIGDAL) experiment aims to observe and measure, for the first time, an atomic ionisation phenomenon known as the Migdal effect, which may offer a new means of detecting light-dark matter particles in underground scattering experiments. The detector operates with an optical Time Projection Chamber filled with low-pressure CF₄ as the base gas, relying on charge and light internal amplification using a stack of glass-Gas Electron Multipliers. In my talk, I will discuss the modelling of the GEMs in COMSOL and charge transportation and gaseous multiplication simulation with the Garf++ package, leading to optimisation of the GEMs used in the MIGDAL detector.

