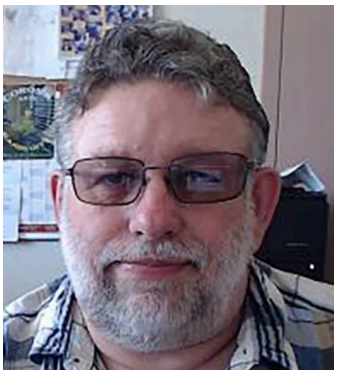
FZU Institute of Physics of the Czech Academy of Sciences

Invitation

to the seminar of Division of Elementary Particle Physics of the Institute of Physics of the Czech Academy of Sciences



Peter Loch

University of Arizona

Jet Reconstruction in the ATLAS Experiment at LHC – from the Earliest Attempts to the Highest Precision

Abstract: The precise reconstruction of particle jets emerging from the proton-proton collisions at the Large Hadron Collider (LHC) is important for many measurements aiming at improving the understanding of the proton structure and the strong force holding it together, and the detection of hadronic decays of already known particles or of postulated new particle searched for. The ATLAS experiment has focused on the development of a highly precise calibration for the measurement of not only the jet kinematics but also of the internal energy flow structure, an important tool for the identification of the jet source and the understanding of the strong force in previously uncovered emission domains. In this talk, we recall some relevant milestones of the evolution of jet reconstruction in ATLAS, after brief introductions into the phenomenology of jet formation and jet substructure, the detector, and the experimental conditions. The recently achieved reconstruction performance is presented. In addition, a measurement is discussed that employs a jet-substructure-based approach to measure the internal radiation and decay patterns in jets that characterize the strong force at a wide range of energy and angular emission scales. This talk concludes with a first look at a newly developed signal calibration for the ATLAS calorimeters based on machine-learning techniques, with the paramount aim to improve the suppression of collision and detector-induced signal backgrounds in this detector system, and thus all aspects of jet and jet substructure reconstruction.

When: Thursday, February 26, 2026 at 2PM

Where: Dvořák hall, FZU, Pod Vodárenskou věží 1, Prague

For more information, please see https://indico.fzu.cz/event/326/

Roman Lysák Jiří Hejbal