Contribution ID: **51** Type: **On-site planned, but remote also possible**

Machine learning algorithm development for jet flavour tagging

The identification of jets containing b-hadrons (flavour tagging) underpins the results in many areas of the physics programme of the ATLAS experiment, such as the observations of the Higgs boson decay into bottom quarks or recent searches for resonant pair production of Higgs bosons.

The long lifetime (τ = 1.5 ps), large mass (m_b = 5 GeV), and decay properties of b-hadrons enables the experimental identification of b-jets exploiting track properties and reconstruction of secondary vertices.

Complex multi-variate jet tagging algorithms are used to classify jets by the flavour of the initial parton. Various architectures of deep neural networks are employed for this task. These networks operate on a range of observables which are sensitive to the properties of b-hadron decays and are trained on a large number of simulated LHC proton-proton collision events.

The student will study improvements in the jet flavour tagging algorithms by training deep neural networks and evaluating their performance in simulated events. This project will enable the student to engage in LHC data analysis using widely used computing tools such as the python programming language and toolkits for machine learning.

Field

B1: Particle physics analysis (software-oriented)

DESY Place

Hamburg

DESY Division

FH

DESY Group

ATLAS

Special Qualifications:

Existing knowledge of Linux/UNIX, Shell and the python programming language is highly preferable.
If the project cannot take place on-site, we can only work in a similar time zone (i.e. CEST +/- few hours).

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