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SEARCH FOR CHARGED LEPTON FLAVOUR VIOLATION IN TOP-QUARK PRODUCTION AND DECAY WITH THE ATLAS EXPERIMENT

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TRANSFER WORKSHOP: ErUM-SCIENTISTS & INDUSTRY IN DIALOGUE, AACHEN

Introduction

Search for a charged lepton flavour violation (cLFV) in a *teµq* vertex

Motivation

- In the SM, lepton flavour is conserved in weak interactions

- Observed neutrino oscillations permit cLFV processes (highly suppressed)

- Experimental evidence of cLFV: sign of physics beyond the SM
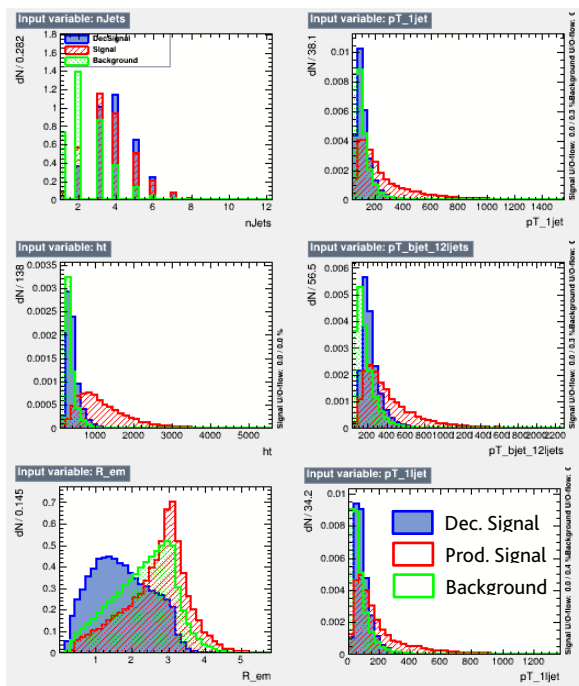
Analysis strategy

1. Preparation of LHC data samples

2. Generation of Monte Carlo simulated samples

3. Event selection and definition of analysis regions

4. Signal discrimination (*machine learning*)
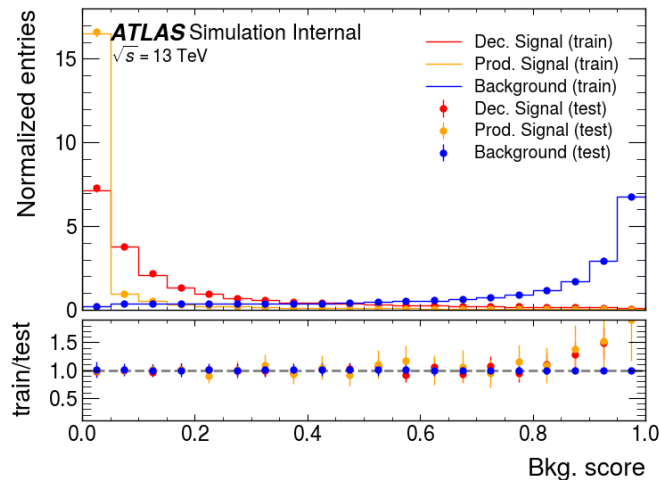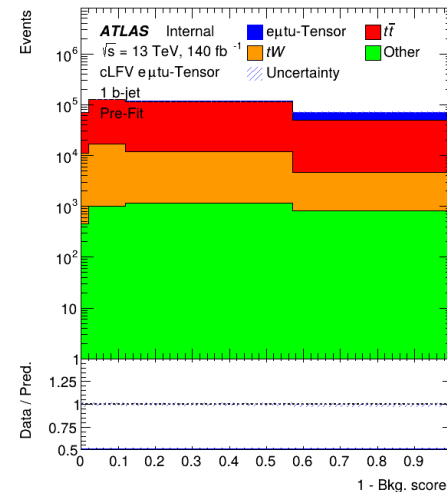
5. Profile-likelihood fit
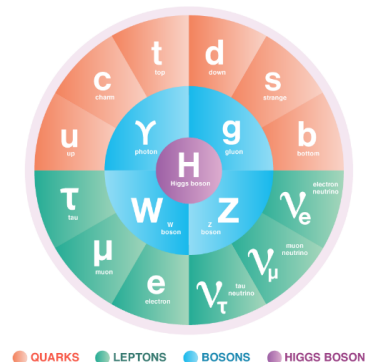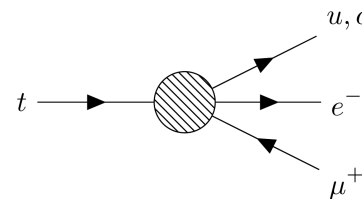
Data analysis

Input variables

BDT discriminant

Profile-likelihood fit

- **Signal discrimination**: multi-class Boosted Decision Tree (BDT)
  - Training over a set of input variables
  - BDT discriminant score as the fit variable
- **Profile-likelihood fit**: statistical hypothesis testing