



Contribution ID: 168

Type: **not specified**

Single top-quark production with the matrix-element method in NLO accuracy

Tuesday 4 April 2017 12:40 (20 minutes)

The electroweak production of single top quarks offers a unique laboratory for precision tests of top-quark related parameters of the Standard Model and possible extensions thereof. To obtain a precise and accurate parameter determination efficient, unbiased and theoretically unambiguous analysis methods are needed. The Matrix Element Method (MEM) has proven beneficial to make maximal use of the information available in experimental data. However, so far it has mostly been applied in Born approximation only. In this talk we discuss the extension to NLO QCD accuracy. As a prerequisite we present an efficient method to calculate event weights for jet events at NLO accuracy. As illustration and proof of concept we use the MEM@NLO to reproduce the top-quark mass from single top events generated at NLO accuracy. We observe that analysing NLO events with LO likelihoods can introduce a pronounced bias in the extracted mass which would require significant calibration with associated uncertainties.

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Session Classification: WG5 Physics with Heavy Flavours

Track Classification: WG5) Physics with Heavy Flavours