

## Abstract

Jets originating from bottom (b) quarks, play an important role in the study of Standard Model processes together with the search for new physics. In the CMS experiment a considerable effort is dedicated to the development and the performance study of so-called b-tagging algorithms. On the other hand, the top quark which is produced in pair with a high rate at the LHC, decays near 99% of the time to a b-quark. Hence it provides a rich source of b-quark jets, suitable for b-jet identification studies. In this thesis, a fully data-driven method to measure the b-tagging efficiency, using top quark events in its semi-electron final state, is developed. The result of the application of the method on the first LHC collisions in 2010 is reported. The method can be extended to a simultaneous top quark cross section and b-tagging efficiency measurement, therefore resulting in smaller uncertainties.