

# XXVIII International Workshop on Deep-Inelastic Scattering and Related Subjects



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## Measurements of the $W$ branching fractions in $t\bar{t}$ production with the ATLAS experiment at the LHC

*Tuesday, 13 April 2021 12:00 (15 minutes)*

The universality of the couplings of the different generations of leptons to the electroweak gauge bosons is at the core of the Standard Model of particle physics. In this contribution, a measurement of the ratio of the rate of decay of  $W$  bosons to  $\tau$ -leptons and muons,  $R(\tau/\mu) = B(W \rightarrow \tau\nu\tau)/B(W \rightarrow \mu\nu\mu)$ , is presented, that constitutes an important test of this axiom. The measurement is based on a novel technique that takes advantage of the abundant  $W$ -boson sample produced in top quark decay, in  $139\text{ fb}^{-1}$  of data recorded with the ATLAS detector in proton–proton collisions at  $\sqrt{s}=13\text{ TeV}$ . The value of  $R(\tau/\mu)$  is found to be  $0.992 \pm 0.013$ , in agreement with the hypothesis of universal lepton couplings as postulated in the Standard Model. This is the most precise measurement of this ratio, and the only such measurement from the Large Hadron Collider, to date.

**Presenter:** BORISSOV, Guennadi (Lancaster University)

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