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Studies of the uncertainty on lepton isolation efficiency

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The isolation requirement on leptons is one the basic selection criteria applied by nearly all analyses studying top-quark decays resulting in one or more leptons in their final state. Scale factors used to account for the difference in the isolation efficiency between Data and Monte Carlo were derived using $Z \rightarrow \ell\ell$ events, characteristic by their low jet multiplicities, and extrapolated to other Monte Carlo samples with various lepton and jet multiplicities. The goal of this project is to evaluate the systematic uncertainty caused by this extrapolation in the $t\bar{t}Z$ cross-section measurement and to prepare a general framework for derivation of new scale factors and uncertainties. Isolation efficiency in various p_T^e, p_T^μ, N_{jets} and μ slices was compared among various Monte Carlo samples and campaigns to evaluate the uncertainty. Effect of the order of 5% was observed and ongoing work is being done to compare the difference to the corresponding systematic uncertainties and to evaluate the need for additional scale factors and uncertainties in the $t\bar{t}Z$ cross-section analysis.

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