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## An embedding technique to determine ττ backgrounds in proton - proton collision data (Article) (Open Access)

Sirunyan, A.M.[a], Tumasyan, A.[a], Adam, W.[b], Ambrogi, F.[b], Asilar, E.[b], Bergauer, T.[b], Brandstetter, J.[b], Dragicevic, M.[b], Erö, J.[b], Escalante Del Valle, A.[b], Flechl, M.[b], Frühwirth, R.[b,gw], Ghete, V.M.[b], Hrubec, J.[b], Jeitler, M.[b,gw], Krammer, N.[b], Krätschmer, I.[b], Liko, D.[b], Madlener, T.[b], Mikulec, I.[b], Rad, N.[b],

View additional authors

[a]Yerevan Physics Institute, Yerevan, Armenia
[b]Institut für Hochenergiephysik, Wien, Austria
[c]Institute for Nuclear Problems, Minsk, Belarus

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## Abstract

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An embedding technique is presented to estimate standard model it backgrounds from data with minimal simulation input. In the data , the muons are removed from reconstructed nn events and replaced with simulated tau leptons with the same kinematic properties. In this way, a set of hybrid events is obtained that does not rely on simulation except for the decay of the tau leptons. The challenges in describing the underlying event or the production of associated jets in the simulation are avoided. The technique described in this paper was developed for CMS. Its validation and the inherent uncertainties are also discussed. The demonstration of the performance of the technique is based on a sample of proton - proton collisions collected by CMS in 2017 at √s = 13 TeV corresponding to an integrated luminosity o 41.5 $fb^{-1}$. © 2019 CERN for the benefit of the CMS collaboration. Published by IOP Publishing Ltd on behalf of Sissa Medialab. Original content from this work may be used under the terms of the Creative Commons Attribution 3.0 licence.

## SciVal Topic Prominence

Topic: Collisions | Jets | Proton–proton collisions

Prominence percentile: 99.939

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Pattern recognition, cluster finding, calibration and fitting methods
Performance of high energy physics detectors

## Indexed keywords

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Engineering uncontrolled terms: Embedding technique | Fitting method | High energy physics detector | Integrated luminosity | Kinematic properties | Proton proton collisions | Standard model

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