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Search for new physics with same-sign isolated dilepton events with jets and missing transverse energy at the LHC

The CMS collaboration

ABSTRACT: The results of searches for new physics in events with two same-sign isolated leptons, hadronic jets, and missing transverse energy in the final state are presented. The searches use an integrated luminosity of 35 pb^{-1} of pp collision data at a centre-of-mass energy of 7 TeV collected by the CMS experiment at the LHC. The observed numbers of events agree with the standard model predictions, and no evidence for new physics is found. To facilitate the interpretation of our data in a broader range of new physics scenarios, information on our event selection, detector response, and efficiencies is provided.

KEYWORDS: Hadron-Hadron Scattering

p_T values. Different models of new physics may thus populate only one or the other of our different search regions.

9 Summary and conclusions

Using two different trigger strategies, we have searched for new physics with same-sign dilepton events in the ee , $\mu\mu$, $e\mu$, $e\tau_h$, $\mu\tau_h$, and $\tau_h\tau_h$ final states, and have seen no evidence for an excess over the background prediction. The τ_h leptons referred to here are reconstructed via their hadronic decays. The dominant background processes in all final states except $\tau_h\tau_h$ involve events with one fake lepton. In the $\tau_h\tau_h$ final state, events with two fake τ_h dominate. We have presented methods to derive background estimates from the data for all major background sources. We have set 95% CL upper limits on the number of signal events within $|\eta| < 2.4$ at 35 pb⁻¹ in the range of 3.1 to 4.5 events, depending on signal region, and have presented details on signal efficiencies that can be used to confront a wide variety of models of new physics. Our analysis extends the region excluded by experiments at LEP and the Tevatron in the CMSSM model.

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