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Search for new physics with dijet angular distributions in proton-proton collisions at √s=13 TeV (Article)

The CMS collaboration, Sirunyan, A.M.[a], Tumasyan, A.[a], Adam, W.[b], Asilar, E.[b], Bergauer, T.[b], Brandstetter, J.[b], Brondolin, E.[b], Dragicevic, M.[b], Erö, J.[b], Flechl, M.[b], Friedl, M.[b], Frühwirth, R.[bgr], Ghete, V.M.[b], Hartl, C.[b], Hörmann, N.[b], Hrubec, J.[b], Jeitler, M.[bgr], König, A.[b], Krätschmer, I.[b], Liko, D.[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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A search is presented for extra spatial dimensions, quantum black holes, and quark contact interactions in measurements of dijet angular distributions in proton-proton collisions at s=13 TeV. The data were collected with the CMS detector at the LHC and correspond to an integrated luminosity of 2.6 fb^{-1}. The distributions are found to be in agreement with predictions from perturbative quantum chromodynamics that include electroweak corrections. Limits for different contact interaction models are obtained. In a benchmark model, valid to next-to-leading order in QCD and in which only left-handed quarks participate, quark contact interactions are excluded up to a scale of 11.5 and 14.7 TeV for destructive or constructive interference, respectively. The production of quantum black holes is excluded for masses below 7.8 or 5.3 TeV, depending on the model. The lower limits for the scales of virtual graviton exchange in the Arkani-Hamed-Dimopoulos-Dvali model of extra spatial dimensions are in the range 7.9–11.2 TeV, and are the most stringent set of limits available.[Figure not available: see fulltext.]. © 2017, The Author(s).

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