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Search for rare decays of Z and Higgs bosons to J/ and a photon in proton-proton collisions at 13 TeV

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Abstract

A search is presented for decays of Z and Higgs bosons to a J/ meson and a photon, with the subsequent decay of the J/ to $\mu^+\mu^-$. The analysis uses data from proton-proton collisions with an integrated luminosity of 35.9fb⁻¹ at $\sqrt{s}=13$ collected with the CMS detector at the LHC. The observed limit on the Z/J/ decay branching fraction, assuming that the J/ meson is produced unpolarized, is 1.4x10⁻⁶ at 95% confidence level, which corresponds to a rate higher than expected in the standard model by a factor of 15. For extreme-polarization scenarios, the observed limit changes from -13.6 to +8.6% with respect to the unpolarized scenario. The observed upper limit on the branching fraction for H/J/ where the J/ meson is assumed to be transversely polarized is 7.6x10⁻⁴, a factor of 260 larger than the standard model prediction. The results for the Higgs boson are combined with previous data from proton-proton collisions at $\sqrt{s}=8$ TeV to produce an observed upper limit on the branching fraction for H/J/ that is a factor of 220 larger than the standard model value.

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KeyWords Plus: [PP COLLISIONS](#); [PARTON DISTRIBUTIONS](#); [MASS](#)

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