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## Search for rare decays of Z and Higgs bosons to J/ψ and a photon in proton-proton collisions at √s = 13 TeV (Article) [\(Open Access\)](#)

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### Abstract

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A search is presented for decays of Z and Higgs bosons to a J/ψ meson and a photon, with the subsequent decay of the J/ψ to  $\mu^+ \mu^-$ . The analysis uses data from proton-proton collisions with an integrated luminosity of 35.9fb<sup>-1</sup> at s=13TeV collected with the CMS detector at the LHC. The observed limit on the Z → J/ψγ decay branching fraction, assuming that the J/ψ meson is produced unpolarized, is  $1.4 \times 10^{-6}$  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/ψγ where the J/ψ meson is assumed to be transversely polarized is  $7.6 \times 10^{-4}$ , 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 s=8TeV to produce an observed upper limit on the branching fraction for H → J/ψγ that is a factor of 220 larger than the standard model value. © 2019, CERN for the benefit of the CMS collaboration.

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