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Volume 2018, Issue 11, 1 November 2018, Article number 172Search for heavy resonances decaying into a vector boson and a Higgs boson in final states with charged leptons, neutrinos and b quarks at  $\sqrt{s} = 13$  TeV (Article) [\(Open Access\)](#)Sirunyan, A.M.<sup>a</sup>, Tumasyan, A.<sup>a</sup>, Adam, W.<sup>b</sup>, Ambrogio, F.<sup>b</sup>, Asilar, E.<sup>b</sup>, Bergauer, T.<sup>b</sup>, Brandstetter, J.<sup>b</sup>, Brondolin, E.<sup>b</sup>, Dragicevic, M.<sup>b</sup>, Erö, J.<sup>b</sup>, Escalante Del Valle, A.<sup>b</sup>, Flechl, M.<sup>b</sup>, Frühwirth, R.<sup>b,gu</sup>, Ghete, V.M.<sup>b</sup>, Hrubec, J.<sup>b</sup>, Jeitler, M.<sup>b,gu</sup>, Krammer, N.<sup>b</sup>, Krättschmer, I.<sup>b</sup>, Liko, D.<sup>b</sup>, Madlener, T.<sup>b</sup>, Mikulec, I.<sup>b</sup>, Rad, N.<sup>b</sup>, <sup>l</sup>[View additional authors](#) <sup>a</sup>Yerevan Physics Institute, Yerevan, Armenia<sup>b</sup>Institut für Hochenergiephysik, Wien, Austria<sup>c</sup>Institute for Nuclear Problems, Minsk, Belarus[View additional affiliations](#)

## Abstract

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A search for heavy resonances, decaying into the standard model vector bosons and the standard model Higgs boson, is presented. The final states considered contain a b quark-antiquark pair from the decay of the Higgs boson, along with electrons and muons and missing transverse momentum, due to undetected neutrinos, from the decay of the vector bosons. The mass spectra are used to search for a localized excess consistent with a resonant particle. The data sample corresponds to an integrated luminosity of  $35.9 \text{ fb}^{-1}$  collected in 2016 by the CMS experiment at the CERN LHC from proton-proton collisions at a center-of-mass energy of 13 TeV. The data are found to be consistent with background expectations. Exclusion limits are set in the context of spin-0 two Higgs doublet models, some of which include the presence of dark matter. In the spin-1 heavy vector triplet framework, mass-degenerate W' and Z' resonances with dominant couplings to the standard model gauge bosons are excluded below a mass of 2.9 TeV at 95% confidence level. [Figure not available: see fulltext.].  
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