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Search for heavy diboson resonances in semi-leptonic final states in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector

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A search for heavy resonances decaying into WW, ZZ or WZ using proton–proton collision data at a centre-of-mass energy of $\sqrt{s} = 13$ TeV. The data, corresponding to an integrated luminosity of 139 fb^{-1} , were recorded with the ATLAS detector from 2015 to 2018 at the Large Hadron Collider. The search is performed for final states in which one W or Z boson decays leptonically, and the other W boson or Z boson decays hadronically. The data are found to be described well by expected backgrounds. Upper bounds on the production cross sections of heavy resonances are derived in the mass range 300–5000 GeV within the context of Standard Model extensions with a neutral scalar, a heavy vector triplet or warped extra dimensions. Production through gluon–gluon fusion, Drell–Yan or vector-boson fusion are considered, depending on the assumed model.

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