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Search for light vector resonances decaying to quarks produced in association with a jet in pp collisions

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A search for narrow vector resonances decaying to quarks is presented using events collected in $\sqrt{s} = 13$ TeV proton-proton collisions with the CMS detector at the LHC. The data sample, collected in 2016, corresponds to an integrated luminosity of 35.9 fb^{-1} . The hypothetical resonance is produced with high transverse momentum such that the decay products of the resonance are merged into a single jet. The resulting experimental signature is an enhancement over background processes in the distribution of the invariant mass of the jet. No evidence for resonant particles are observed within the targeted mass range from 50-300 GeV. Upper limits at a 95% confidence level are set on the production cross-section of leptophobic vector resonances. Results are presented in a mass-coupling phase space and are the most sensitive to date, extending previous limits below 100 GeV. The limits are also presented as functions of dark matter mass, in a simplified model of interactions between quarks and dark matter with a vector mediator.

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