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Physical Review D

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Search for R -parity violating supersymmetry with displaced vertices in proton-proton collisions at  $s = 8$  TeV (Article) [\(Open Access\)](#)Khachatryan, V.<sup>aig</sup>, Sirunyan, A.M.<sup>a</sup>, Tumasyan, A.<sup>a</sup>, Adam, W.<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>, Flechl, M.<sup>b</sup>, Friedl, M.<sup>b</sup>, Frühwirth, R.<sup>bcp</sup>, Ghete, V.M.<sup>b</sup>, Hartl, C.<sup>b</sup>, Hörmann, N.<sup>b</sup>, Hrubec, J.<sup>b</sup>, Jeitler, M.<sup>bcp</sup>, König, A.<sup>b</sup>, Krätschmer, I.<sup>b</sup>, Liko, D.<sup>b</sup>, Matsushita, T.<sup>b</sup>,[View additional authors](#) [v](#)<sup>a</sup>Yerevan Physics Institute, Yerevan, Armenia<sup>b</sup>Institut für Hochenergiephysik, Wien, Austria<sup>c</sup>National Centre for Particle and High Energy Physics, Minsk, Belarus[View additional affiliations](#) [v](#)

## Abstract

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Results are reported from a search for R-parity violating supersymmetry in proton-proton collision events collected by the CMS experiment at a center-of-mass energy of  $s = 8$  TeV. The data sample corresponds to an integrated luminosity of 17.6 fb<sup>-1</sup>. This search assumes a minimal flavor violating model in which the lightest supersymmetric particle is a long-lived neutralino or gluino, leading to a signal with jets emanating from displaced vertices. In a sample of events with two displaced vertices, no excess yield above the expectation from standard model processes is observed, and limits are placed on the pair production cross section as a function of mass and lifetime of the neutralino or gluino. At 95% confidence level, the analysis excludes cross sections above approximately 1 fb for neutralinos or gluinos with mass between 400 and 1500 GeV and mean proper decay length between 1 and 30 mm. Gluino masses are excluded below 1 and 1.3 TeV for mean proper decay lengths of 300  $\mu$ m and 1 mm, respectively, and below 1.4 TeV for the range 2-30 mm. The results are also applicable to other models in which long-lived particles decay into multijet final states. © 2017 CERN.

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