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Multiwavelength monitoring of gravitationally lensed blazar QSOB0218+357 between 2016 and 2020

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QSO B0218+357 (z = 0.944±0.002) is currently the only gravitationally lensed source from which very-high-energy (VHE, >˜100GeV) gamma-ray emission has been detected. We report the Fermi-LAT monitoring of the source between 2016 and 2020 in conjunction with multiwavelength monitoring observations in radio interferometry and in the optical, X-ray, and VHE ranges. During the monitoring, individual flares in optical, X-ray and GeV bands were observed. An observable effect of the gravitational lensing , during bright flares, is a time delay between the lensed images. Fermi-LAT detected previous flares in 2012 and 2014, allowing for a measure of the delay (˜11 days) compatible with measures done in other wavelengths. Simultaneous data taken by the MAGIC telescopes allow us to search for the associated VHE emission, constraining the VHE gamma-ray duty cycle of the source, even in the absence of a significant detection. We use the X-ray data obtained with XMM to evaluate the column density of the dust in the lensing galaxy (z = 0.68466±0.00004). We use radio interferometry measurements to model the source-lens-observer geometry and determine the magnifications and time delays for different components of the image. We model the quiescent emission in which the high-energy bump is explained as a combination of synchrotron-self-Compton and external Compton processes. The bulk of the low energy emission can be explained as originated from a region located along the jet at tens of parsecs from the central engine.

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