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Fermi-LAT observations of gamma-ray emission from interstellar visitors 1I/'Oumuamua and 2I/Borisov

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The asteroid 1I/'Oumuamua (A/2017 U1) and the cometary-like object 2I/Borisov (C/2019 Q4) are the first two objects of interstellar origin discovered in our Solar system. They approached the Earth in October 2017 and in December 2019 respectively. A gamma-ray emission is expected from these objects due to interaction of Cosmic Rays (CRs) with their surfaces, while more exotic models predict possible gamma-rays due to accelerated particles or dark matter. We searched for a gamma-ray emission with the Fermi Large Area Telescope (LAT), focusing on the period around the minimum distance from Earth. Two independent analyses were performed, taking into account the path of the two objects moving in the sky. The first method consists in an ON/OFF likelihood analysis of the signal and background regions, while the second is based on a quasi static point source likelihood analysis. No significant signal was found and upper limits on the gamma-ray flux were derived. These results will be discussed in relation to a simple physical model based on CR interaction, providing information on the physical size of the two objects.

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