

Constraining the nature of bow shocks of runaway stars through Fermi-LAT observations

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Bow shocks of runaway stars were suggested as possible sources of high-energy gamma-ray emission. In addition to the detection at infrared wavelengths, there have recently been claims for detection in X-rays and radio, indicating a spectrally wide non-thermal component. For the first time we systematically analyzed nearly five years of Fermi-LAT data from the regions of 28 bow shock candidates. These candidates are the ones listed in the E-BOSS catalogue of stellar bow shocks. Since no significant emission was found, we calculated flux upper limits. For one of the candidates (Zeta Ophiuchi) a recent prediction of gamma-ray emission can be robustly ruled out by our data. Our flux upper limits on the gamma-ray emission from any of the known stellar bow shocks strongly constrain the possible gamma-ray component that these objects may have.

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