

Searching for gamma-ray binaries using GOSC and Gaia DR2

Gamma-ray binaries, which contain a massive star and a compact object, are very interesting astrophysical laboratories because particle acceleration and radiation/absorption mechanisms are modulated by the orbital phase. However, only 7 of such sources are currently known: 2 composed of an O-type star and 5 of a Be-type star, being the systems with an O-type star runaways with respect to their environment. Gaia DR2 provides us with useful information of positions, proper motions and distances for 1332 million sources. To search for new gamma-ray binaries we have studied a sample of 370 O-type stars from the GOSC catalog. Since Gaia DR2 does not fit the 7 orbital parameters for binaries, we could expect bad astrometric fits for some gamma-ray binaries. Among the 370 O-type stars we have found 36 with bad astrometric fits. We have also computed the peculiar velocities of the remaining 334 O-type stars and found 74 runaways, some of which could be part of new gamma-ray binaries. We conclude with a short discussion and an outlook of future work.

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