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Searching for highly obscured gamma-ray binaries

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A significant fraction of currently known gamma-ray binaries have bright optical counterparts that were classified as luminous early-type stars in objective prism catalogues compiled more than half a century ago. Representative examples of this statement include, in particular, LS I 61303, LS 5039 and also MWC 148. In previous years, we explored several of these historical catalogues by cross-correlating them with different Galactic plane radio surveys in an attempt to search for weak, non-thermal radio counterparts that could betray new systems where very high-energy phenomena are at work. So far, the degree of success has been low. Nevertheless, it could likely increase in parallel with modern survey sensitivities, hopefully with the new VLA Sky Survey. In this contribution, we report about the recent extension of our approach to the catalogue of highly reddened and distant stars compiled by C. B. Stephenson back in the nineties. As a result, at least one promising candidate has been identified located inside the error circle of the gamma-ray source HAWC J1831-096 and is at present under extensive follow-up study.

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