

Peer Review

Review of: "Untangling Magellanic Streams"

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This paper presents the results of a search for possible stellar counterparts to the Magellanic Stream (MS) using the H3 and Gaia datasets. The authors identify a set of stars along the sub-dominant strand of the MS, while the dominant strand appears devoid of stars. Based on this finding, the authors propose several hypotheses in the abstract. The study is valuable and makes a significant contribution to understanding the formation mechanisms of the Magellanic System. However, the reliability and confidence levels of the identified candidates need to be more rigorously evaluated before publication.

The confidence in associating these stars with the Magellanic Stream requires further scrutiny. Based on the current analysis, there is a high likelihood that these stars belong to the Galactic halo population. This conclusion is supported by the following observations:

- Spatial Distribution

In Figure 2, the stars selected based on the relationship between distance and radial velocity appear randomly distributed on the sky, with no evident positional preference. While there is a slight overdensity near $L_{\text{MS}} \sim 80$ degrees, this requires quantitative analysis to determine the confidence level associated with these stars and their potential connection to the MS.

- Chemical Abundance

The chemical properties of the 17 selected candidate stars do not exhibit a clear distinction from those of halo stars, as shown in Figure 7. Among the 17

candidates, the majority exhibit metallicities consistent with halo stars, with only four stars showing notably low α -abundance.

- Connection with Other Structure

The overdensity near $L_{\text{MS}} \sim 80$, also identified using Gaia data, appears to align well with the Pisces Plume, a dynamical friction wake of the Large Magellanic Cloud (LMC). The potential contribution of this structure to the observed candidate stars should be carefully considered. As demonstrated by Vasiliev (2023, *Galaxies*, 11, 59; see Figure 5), the wake of the LMC exhibits a clear overdensity in this region and at the same distance, and its contribution to the stellar population attributed to the MSS needs further discussion.

Minor point:

The selection criteria based on energy appear insufficiently justified. Figure 1 suggests that only radial velocity, rather than the full kinematic energy, is used. This should be better explained.

Declarations

Potential competing interests: No potential competing interests to declare.