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Tracing the Motions and Metallicities of Globular Cluster Streams

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Stellar streams are elongated trails of stars stripped by tidal forces from globular clusters and dwarf galaxies. These tidal features offer a powerful way to probe the formation history of the Milky Way and its dark matter substructure. This work aimed to develop a pipeline to characterize the kinematic and chemical properties of stellar streams associated with globular clusters, using spectroscopic data from the Dark Energy Spectroscopic Instrument (DESI) Milky Way Survey. This data was processed using a Bayesian Mixture Model to select the stream's high-probability members. So far, we have added five globular cluster streams to our catalogue: C-19, Sylgr, Fjorm, Gaia 10, and Gaia 6. We estimated the mean line-of-sight velocity and metallicity $[Fe/H]$ dispersions for the five streams, the latter of which ranged from -3.58dex to -1.40dex . These and the resulting 6-D stream tracks can provide insight into the nature of the stream's progenitors (e.g., globular cluster vs. dwarf galaxy) and potential perturbations from past interactions with dark matter subhalos. The results show improved results compared to galstream stream tracks, suggesting that our approach is robust and capable of being scaled to other streams. We plan to systemically apply our approach to ~ 15 streams observed by DESI.

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