Chemical tagging of Stellar streams: Origin Scenarios

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Stellar streams are the kinematically coherent groups of stars, scattered all over the sky, and are not gravitationally bound. They appear as over-densities in the velocity space. Open clusters are groups of coeval, chemically homogeneous stars, gravitationally bound with each other. The striking similarity between stellar streams and open clusters is that, both are kinematically coherent groups. It has been long thought that stellar streams formed as a result of open cluster disruption, the dispersed members having retained the parental cluster kinematics, and were the intermediate phase between open clusters and field stars in the Galaxy. While many of the proposed stellar streams in the literature share the motion of well known open clusters, some streams do exist without any defining clusters. Here, we have tried to probe the origin of a few stellar streams in the disc of the Galaxy, by chemically tagging them, performing the detailed abundance analysis. We discuss 3 streams that share well known cluster kinematics (Hyades, Pleiades, Sirius) and 3 streams that do not have any known association with clusters (Arcturus, Hercules and AF06) in the context of various origin scenarios. The streams being the result dynamical perturbation in the Galaxy and the debris of accreted satellite will also be discussed. The significant result of this study is that none of the streams show chemical homogeneity, and the abundance pattern imply member stars may not have originated solely from their corresponding defining clusters.