Runaway Stars: Looking for Variability in Hypervelocity Star Candidates

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My hypothesis is that a little less than 10% of hypervelocity stars (HVSs) will be found in the asymptotic giant branch (AGB). If HVS candidates are observed over a longer period of time, I expect the majority will be main sequence stars and show no variability in magnitude. If variability is found, that would be an indication that the star is more evolved and a part of the AGB. Images of 28 HVS candidates were retrieved from the Pan-STARRS archives. Images that didn't have the target were eliminated, and then the images were sorted by color filter (G, I, R, Y, and Z). Using Mira AL software, the photometry was then performed. The target was set as a standard magnitude of 10, and then 3-6 other comparison stars were selected and measured based off of the target. Next the average and standard deviation were calculated for each star in each filter. The Julian Date was then plotted in a scatter graph against the magnitude of each of the comparison stars in each filter. Lastly, the overall average and standard deviation of each filter were calculated for all 28 targets. Target J110208.65+575200.2 showed significantly higher standard deviation values. This is an indication that this star is variable and potentially a part of the AGB, however further analysis will be needed for confirmation. I conclude that the majority of the stars I analyzed are not variable beyond 0.5 magnitudes, thereby supporting my hypothesis.

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