WIDE BINARIES: PROBES OF THE GALAXY'S DARK MATTER CONTENT

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Photometric parallaxes derived from B, V, R, I photometry of wide binaries with white dwarf components were used to set a firm lower limit to the age of the Galactic disk (see Oswalt et al. 1996 and the article by Wood elsewhere in these proceedings). Here we show the distribution of projected semi-major axes derived from new B, V, R, I data for over 200 wide pairs.

Like clusters, wide binaries are gradually disrupted, primarily by the gentle but cumulative effects of encounters with the denser parts of giant molecular clouds (see Wasserman & Wienberg 1991 for a review). A sharp cut-off in semi-major axes > 0.1 pc was one of the predictions of competing models. Wood & Oswalt (1992) showed that additional orbital expansion occurs in wide pairs which have experienced isotropic post-MS mass loss. Can we see the signatures of these events in the wide binary sample?

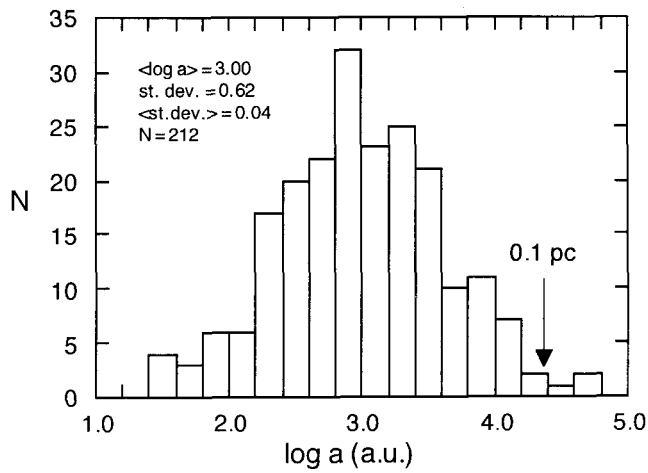

Figure 1. Frequency distribution of wide binary separations determined from photometric parallaxes.

Figure 1 shows that typical pairs are separated by $\approx 10^3$ a.u., with very few wider than 0.1 pc. However, the distribution in $\log(a)$ is nearly Gaussian, with no evidence for a sharp cut-off at the widest separations. A detailed analysis and comparison to the $\log(a)$ distribution for un-evolved pairs will be published elsewhere.

References

Oswalt, T.D. et al. 1996, Nature (letters), 382, 692.
Wasserman, I., & Weinberg, M.D. 1991, ApJ 382, 149.
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