

## WISE Observations of Jupiter Trojans

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We are presenting our analysis of the observations of the Jupiter Trojan population performed by the *Wide-field Infrared Survey Explorer* (WISE). WISE launched December 14, 2009 and began its survey operations a month later. It scans the sky from a sun-synchronous ecliptic polar orbit simultaneously in four thermal infrared wavelengths (3.4, 4.6, 12 and 22  $\mu\text{m}$ ) [1, 2].

There are currently about 4750 known Jupiter Trojans and WISE has reported observations of 1721 of these, increasing the number of thermal emission measurements of this population by more than an order of magnitude compared to earlier surveys [3, 4, 5]. Furthermore, WISE observed an additional 200-300 objects that the [Minor Planet Center](#) has given Trojan-like orbits, but these have observational arcs that are too short for their identification to be secure.

### Observations

WISE observed the sky in scans of constant ecliptic longitude and when the survey started the first scans were already into the leading Trojan cloud. The scans moved toward the tail of the cloud, resulting in about one third of the leading cloud closest to Jupiter remaining unobserved during the cryogenic survey (although it was observed about seven months later with the two shortest wavelength bands during the post-cryogenic mission). After exiting the leading cloud in late February, WISE's scans almost immediately entered the tail end of the trailing cloud on the opposite side of the Solar System. Observations of the trailing cloud ended in late May. It is important to note that the tail end of the trailing cloud was close to the galactic center when observed, leading to a noticeable loss of detection efficiency for less than 10% of this cloud.

### Results

While the two clouds were not observed with perfect uniformity, WISE provides by far the most uniform survey of the Jupiter Trojan population to date. Of the 1721 objects that have been conclusively identified as Trojans, 972 were observed in the leading cloud and 749 in the trailing cloud. This yields a pre-debiased ratio of  $\sim 1.3$  for the number of objects in the leading and trail-

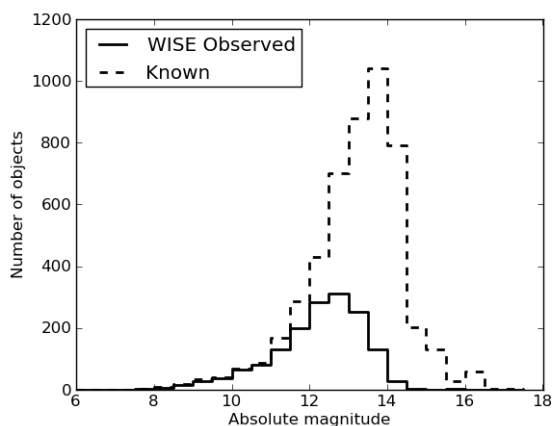


Figure 1: The absolute magnitude distribution of the WISE observed sample, versus the known Trojan population.

ing clouds. The 200-300 probable Trojans also observed by WISE are about equally distributed among the two clouds. The absolute magnitude shows that the survey is limited to about  $H \sim 13$  (or about 12km if assuming an albedo of 7%; Figure 1).

The survey provides an unique opportunity to not only characterize the physical properties of a large fraction of the Jupiter Trojan population, but it also provides an uniform survey of both clouds. A proper debiasing of the survey is underway to test the initial results that show an overabundance of objects in the leading cloud compared to the trailing cloud. In addition, work to provide proper vetting of the short-arc sample using the on-sky velocities (similar to the method used on the SDSS data by Szabó et al. [6]) and thermal colors is also being performed. The results of this work will be presented at the meeting.

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