

The Census of Objects within 10 Parsecs

*Todd J. Henry, Wei-Chun Jao, Jennifer G. Winters,
Sergio B. Dieterich, Charlie T. Finch, Nigel C. Hambly,
Philip A. Ianna, Donald W. McCarthy, Jr., Adric R. Riedel,
John P. Subasavage, and the RECONS Team*

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The sample of stars, brown dwarfs, and exoplanets known within 10 parsecs of our Solar System as of January 1, 2015 is presented. All systems have trigonometric parallaxes of 100 mas or more with errors of 10 mas or less. Included in the sample are 12 systems in the southern sky added to the sample via new parallaxes from the RECONS (REsearch Consortium On Nearby Stars, www.recons.org) effort at the CTIO/SMARTS 0.9m.

The census consists of 366 stars (including the Sun and white dwarfs), 37 brown dwarfs, and 34 planets (eight in our Solar System and 26 exoplanets). Red dwarfs clearly dominate the sample, accounting for 75% of all stars known within 10 pc, while brown dwarfs are currently outnumbered 10 to 1 by stars. The completeness of the sample is assessed, indicating that additional discoveries of red, brown, and white dwarfs within 10 pc, both as primaries and secondaries, are likely, although we estimate that roughly 90% of the stellar systems have been identified. The evolution of the 10 pc sample over the past 70 years is outlined to illustrate the growth of the sample.

The luminosity and mass functions are described. In contrast to many studies, once all known close multiples are resolved into individual components, the true stellar mass function rises to the end of the main sequence. With far fewer brown dwarfs than stars, different formation scenarios for objects that fuse hydrogen and those that do not are likely. Of 270 stellar primaries, 28% have companion stars, only 2% have brown dwarf companions, and 6% have detected planets. The planetary rate so far is low but climbing, while searches for brown dwarf companions to stars within 10 pc have been quite rigorous, so the brown dwarf companion rate is unlikely to rise noticeably. Overall, the solar neighborhood is dominated by small stars that are potentially orbited by many small, as yet unseen, planets.

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