



# Discovery of a Companion at the L/T Transition with the Wide-field Infrared Survey Explorer

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We report the discovery of a substellar companion to the nearby solar-type star HD 46588 (F7V, 17.9 pc, ~3 Gyr). HD 46588 B was found through a survey for common proper motion companions to nearby stars using data from the Wide-field Infrared Survey Explorer and the Two-Micron All-Sky Survey. It has an angular separation of 79.2" from its primary, which corresponds to a projected physical separation of 1420 AU. We have measured a spectral type of L9 for this object based on near-infrared spectroscopy performed with TripleSpec at Palomar Observatory. We estimate a mass of  $0.064+0.008/-0.019$  Msun from a comparison of its luminosity to the values predicted by theoretical evolutionary models for the age of the primary. Because of its companionship to a well-studied star, HD 46588 B is one of the few known brown dwarfs at the L/T transition for which both age and distance estimates are available. Thus, it offers new constraints on the properties of brown dwarfs during this brief evolutionary phase. The discovery of HD 46588 B also illustrates the value of the Wide-field Infrared Survey Explorer for identifying brown dwarfs in the solar neighborhood via their proper motions.

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