An Investigation of New Brown Dwarf Spectral Binary Candidates From the Backyard Worlds: Planet 9 Citizen Science Initiative

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My study examines three new brown dwarf spectral binary candidates, CWISE J072708.09-360729.2, CWISE J103604.84-514424.4, and CWISE J134446.62-732053.9, which were discovered by citizen scientists actively participating in the Backyard Worlds: Planet 9 initiative. Through subsequent near-infrared spectroscopy, I found that these objects are poorly fit by single near-infrared standards. However, by using binary templates, I achieved notably improved fits, attributing component types of L7+T4, L7+T4, and L7+T7 to CWISE J072708.09-360729.2, CWISE J103604.84-514424.4, and CWISE J134446.62-732053.9, respectively. Additionally, I calculated spectroscopic indices to investigate for indications of both binarity as well as high-amplitude variability, identifying CWISE J072708.09-360729.2 as a strong variable candidate. My findings provide preliminary evidence and characterization of distinct brown dwarf sources, underscoring their potential as compelling targets for continued investigations through high-resolution imaging or analysis of photometric variability.

Awards Won:
Third Award of $1,000