

Precise Mass Measurements of nearby TESS Planets around M Dwarfs with MAROON-X

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M dwarfs provide us with a unique opportunity to precisely study the formation, composition, and habitability of rocky planets. However, their low luminosity makes them challenging to study with high-precision RV surveys. MAROON-X, a RV spectrograph with optical/NIR wavelength coverage and extremely low RV errors, is an ideal instrument for studying these objects.

Over the past two years, we have been performing a survey of TESS planet candidates around nearby M dwarfs with MAROON-X. This sample gives us the opportunity to study the water content of M dwarf planets, the cause of the radius gap, and the diversity of planet compositions we can expect to see around M dwarfs. We can also probe the statistics of these objects given the biases of the TESS TOI sample. Our observations have yielded improvements in mass precision, the discovery of additional non-transiting planets, and first-time mass characterizations. We find that the majority of the transiting TESS planets are consistent with having compositions much like that of Earth, with only a few small planets having densities consistent with being water worlds.