

Contributed Talk

Splinter Exoplanets

FIRST RESULTS FROM CARMENES VISUAL-CHANNEL
RADIAL-VELOCITY MEASUREMENTS

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We report new precise optical radial velocity (RV) measurements obtained with CARMENES for seven known M-dwarf planet hosts. These stars had been observed before with ultra-precise optical spectrographs such as HIRES and HARPS and were either reported to have one short period planetary companion (GJ 15 A, GJ 176, GJ 436, GJ 536 and GJ 1148) or are multiple planetary systems (GJ 581 and GJ 876). We aim at extending the baseline of observations for these stars and to quantify the performance of the CARMENES visual-channel in comparison with HARPS and HIRES. Our Doppler analysis of the combined HIRES, HARPS and CARMENES data uses by far the

most complete set of high-precision RV data for these stars, allowing us to update the planetary orbital parameters and discover new planets in these systems. Based on our precise CARMENES data and the extended HIRES data we report the discovery of GJ 1148 c, a second eccentric ($e_c = 0.342^{+0.050}_{-0.062}$) Saturn-mass ($m_c \sin i = 68.1^{+4.9}_{-2.2} M_{\oplus}$) planet around GJ 1148 with a period of $P_c = 532.6^{+4.1}_{-2.5}$. We also report the discovery of another Saturn-mass ($m_c \sin i = 51.8^{+5.5}_{-5.8} M_{\oplus}$) planet GJ 15 Ac, which is currently the longest period planet around an M-dwarf star with a period of $P_c = 7025^{+972}_{-629}$ days. In addition to these two new planet discoveries, we confirm the planets around all the investigated stars and we shed new light on their Keplerian orbits and dynamical properties. The only exception is GJ 15 Ab, for which we conclude that our precise CARMENES data and the post-discovery HIRES data show no evidence for the existence of the planet, which possibly leaves GJ 15 A only with the newly discovered planet c. Overall, our results demonstrate that the CARMENES optical RVs have a precision comparable to that of HARPS and are more precise than those of HIRES. We conclude that the CARMENES visual-channel is a state-of-the-art instrument, which is fully capable to discover potentially habitable rocky planets around low-mass stars.