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Multiplicity study of exoplanet host stars

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Abstract. We present recent results of our ongoing multiplicity study of exoplanet host stars.

1. New low-mass stellar companions of exoplanet host stars

In our imaging campaign, carried out with SofI/NTT and UFTI/UKIRT, we directly detected so far several new companions of exoplanet host stars. Among them HD 3651 B the first T dwarf companion of an exoplanet host star (1, 2), HD 27442 B a white dwarf which is the secondary of the most evolved exoplanet host star system presently known (3), as well as the binary companion of HD 65216, whose B component is a low mass star, while HD 65216 C is either a massive brown dwarf or a very low-mass star (4). Recently, we identified two new low-mass stellar companions of the exoplanet host stars HD 125612 and HD 212301. The co-moving companion of HD 125612 is a wide M4 dwarf ($0.18\,M_{\odot}$), located about 4750 AU south-east of its primary. The co-moving companion of HD 212301 is a close M3 dwarf ($0.35\,M_{\odot}$), which we found at about 230 AU north-west of the exoplanet host star. The binaries HD 125612 AB and HD 212301 AB are two new members in the continuously growing list of exoplanet host star systems of which more than 40 are presently known (5).

2. Lucky-Imaging search for close companions of exoplanet host stars

We started a search for close stellar companions of exoplanet host stars at the Calar Alto Observatory in Spain, using the Lucky-Imaging (L-I) technique. The observations are carried out with the 2.2 m telescope and its L-I camera AstraLux in the I-band. We take several thousand images with integration times down to 30 ms, and choose a total integration time of about 30 min per target. After standard data-reduction, our L-I pipeline measures the Strehl-ratios of all images, and then selects only those images with the highest Strehl-ratios (selection rates from 1 to 10%). Finally, all selected images are shifted and combined. With the achieved AstraLux detection limit, beyond 1 arcsec (∼40 AU of projected separation at the average distance of our targets), we are sensitive to all stellar companions (with $M > 0.08\,M_{\odot}$) around our targets. Hence, close stellar companions that remain invisible in seeing limited observations are clearly detectable.

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