Bispectrum speckle interferometry of the Orion Trapezium stars: detection of a close (33 mas) companion of $\Theta^1$ Ori C


$^a$ Special Astrophysical Observatory of the Russian AS, Nizhnij Arkhyz 369167, Russia
$^b$ Max-Planck-Institute for Radioastronomy, Auf der Hugel 69, D-53121 Bonn, Germany
$^c$ Astrophysical Institute, Potsdam, An der Sternwarte 16, D-14482 Potsdam, Germany

Abstract. We present bispectrum speckle interferometry observations with the SAO 6 m telescope of the four brightest stars in the Orion Trapezium. Diffraction-limited images with an unprecedented resolution $\lambda/D$ of 57 mas and 76 mas were obtained in the H- and K-band, respectively. The H and K images of $\Theta^1$ Ori C (the star responsible for the proplyds) show for the first time that $\Theta^1$ Ori C is a close binary with a separation of only $\sim$ 33 mas (H-band observation). The sub-arcsecond companions of $\Theta^1$ Ori A and $\Theta^1$ Ori B reported by Petr et al. (1998) are confirmed. We use the magnitudes and colors of the companions to derive information about their stellar properties from the H–R diagram. In addition we briefly discuss the multiplicity of the Trapezium stars. Considering both, the visual and spectroscopic companions of the 4 Trapezium stars, it has been found that there are at least 7 companions, i.e. at least 1.75 companions per primary on average. This number is clearly higher than that found for the low-mass stars in the Orion Nebula cluster as well as in the field population. This suggests that the mechanisms operative in the formation of high-mass multiple systems in the dense Trapezium cluster and of low-mass stars are different.