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The Multiplicity of Massive Young Stellar Objects

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The question of the formation of massive stars, and massive binaries in particular is still very open. More than 90%, and perhaps all, high-mass main sequence stars are found in binary systems, while close massive binaries are responsible for some of the most energetic phenomena in the Universe. In order to understand massive stars and their evolution, it is therefore essential to find out how they formed in binary or multiple systems and how these primordial binaries evolve into the Main Sequence systems observed. This requires studying them at the earliest stages possible, however, data on young massive binary systems is very sparse. We are carrying out a project to determine the Multiplicity of Young MAssive Stars at all scales. The project uses methods probing different separations: with increasing separation, these range from spectroscopy, interferometry, proper motion studies to imaging. I will give an overview of the project and results obtained so far. Amongst others, these indicate that the binarity of massive stars is already large at a young stage, that mass ratios are close to one rather than randomly sampled from the Initial Mass Function, while there is evidence that binaries harden as a function of time. I will present recent modelling results indicating that the large multiplicity fractions of Massive Young Stars at all scales implies that massive stars predominately form in multiple systems rather than binary systems. This is supported by the observations when data probing the various separation scales are combined.

Presenter: Dr OUDMAIJER, René (Royal Observatory of Belgium)

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