EWASS 2019: Special Session 22
Stellar multiplicity in the Gaia era: where do we stand?

Lyon, June 25, 2019

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FOREWORD

Observations show that multiple stellar systems are ubiquitous in stellar populations and across the HR diagram, from pre-main sequence to white dwarfs, neutron stars and black holes. Those objects are therefore unavoidable for anyone interested in stellar physics. Studying multiple stars is not only fundamental to decipher their formation and evolution, producing an incredibly complex zoo of stellar families, but it is also a gate to understand the physics of single stars, in particular the stellar structure and nucleosynthesis.

The next Gaia data release will provide an unprecedented set of stellar binaries. By the nominal end of the mission, up to 50 million of binaries (astrometric, spectroscopic and eclipsing) are expected. Numerous physical quantities will be derived for these systems, among which masses, radii, periods and eccentricities. On the other hand, over the last fifteen years other large (spectroscopic and asteroseismic) surveys have been running or are still on-going. Although these surveys were not necessarily designed for the hunt of stellar binaries, they have already provided us with a fast increase in the list of known binaries. Also, the last data release of Gaia already hinted at unprecedented numbers of so-far unknown binaries by noting that their luminosities are higher than expected for single stars of the same type. Moreover, a large number of wide binaries will be discovered thanks to their proper motions and parallaxes.

This session[1] aims at addressing the following topics: What are the fractions of binaries and higher-order multiplicities in different stellar environments? What are the distributions of periods and mass ratios and how do they depend on spectral types, metallicity and birth environment? What can we learn from this about the formation and evolution of double and multiple systems?

Invited speakers:

- Dimitri Pourbaix (ULB, Belgium): Binaries in *Gaia* perspective - DR3 teaser
- Maxwell Moe (University of Arizona, USA): Multiplicity statistics and properties across the HR diagram
- Gregor Traven (Lund University, Sweden): Machine learning techniques meet binaries
- Cathie Clarke (Cambridge, UK): The theory of multiple star formation in the *Gaia* era
- Alain Jorissen (ULB, Belgium): Impact of binaries on stellar evolution in the *Gaia* era

T. Merle & M. Van der Swaelmen

[1] Available online: `https://eas.unige.ch/EWASS2019/session.jsp?id=SS22`

Fig. 1. Dimitri Pourbaix teasing *Gaia* DR3.

Fig. 2. Gregor Traven meeting binaries.

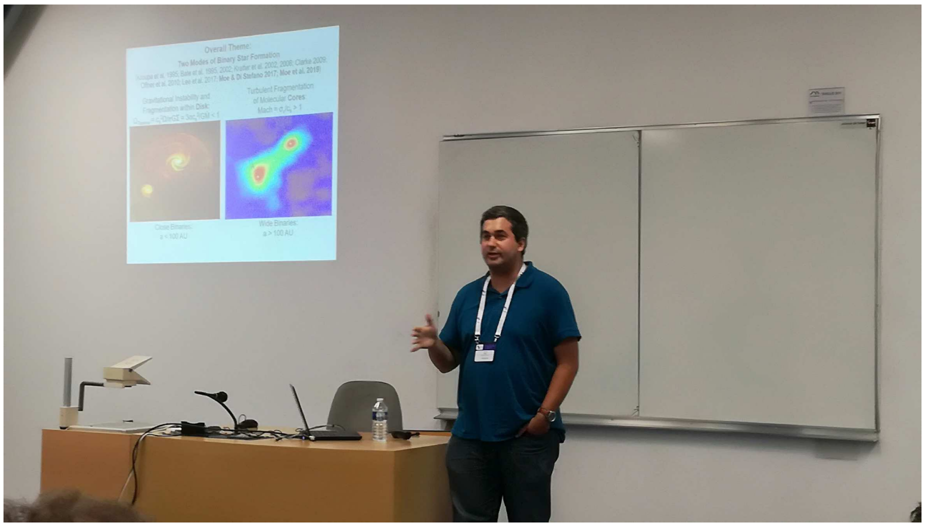

Fig. 3. Maxwell Moe across the HR diagram.

Fig. 4. Cathie Clarke forming binaries.

Fig. 5. Alain Jorissen evolving binaries.

Fig. 6. From left to right: C. Clarke, T. Merle, M. Van der Swaelmen, Maxwell Moe and Douglas Boubert.

Fig. 7. From left to right: M. Van der Swaelmen, S. Van Eck, T. Zwitter, G. Traven and T. Merle.