

41st Liège International Astrophysical Colloquium: The Eventful Life of Massive Star Multiples – Foreword

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Abstract

The 41st LIAC “The eventful life of massive star multiples” took place in Liège in July 2024. The following articles of this volume constitute the proceedings of contributions presented at this conference. Their main themes are the formation of massive multiple systems, the various interactions in these systems and their consequences on the subsequent stellar evolution, as well as the endpoints of evolution with single- and double-compact binaries.

Keywords: stars: early-type, binaries: general, stars: evolution, stars: formation, X-rays: binaries, gravitational waves

The Eventful Life of Massive Star Multiples

Since the first stars lit up the Universe, the most massive objects of the stellar population ($> 10M_{\odot}$) have been prominent actors in cosmic evolution. Massive stars exert strong feedback on their environment thanks to their bright ionizing radiation, varied nucleosynthesis processes, and large mechanical input (from winds, eruptions, and supernovae). Most, if not all, of these massive stars reside in multiple systems and the presence of companion(s) affects their evolution throughout their entire lives.

Our conference “The eventful life of massive star multiples” proposed to take an in-depth look at these massive stellar couples, from their formation to their afterdeath as remnants, and to examine the various aspects of the binary interactions at all stages. It was organized in the framework of the series of Liège International Astrophysical Colloquia (LIAC), continuing an heritage of previous colloquia focused on massive stars (33rd LIAC, 38th LIAC, 39th LIAC). The conference took place in Liège during the week of 15–19 July 2024 with 87 participants from institutes in 21 countries all over the world (Fig. 1).

The scientific organizing committee (SOC) was composed of Yaël Nazé (chair), Maxime Fays (co-chair), Enrico Bozzo, Alessandra Corsi, Laurent Mahy, Nicole St Louis, Ling Sun, and

Dany Vanbeveren. The local organizing committee (LOC) gathered Yaël Nazé (chair), Maxime Fays (co-chair), Giacomo Bruno, Jean-René Cudell, Alain Detal, Damien Hutsemékers, Nicole Massin, Thierry Morel, and Gregor Rauw. Particular care was given to gender, seniority, and geographical distributions: the final program reflects the statistics of the proposals; gender parity was achieved for SOC, session chairs, and invited reviewers; and session chairs were all chosen amongst junior researchers (less than 10 years since PhD graduation).

The colloquium was organized in five thematic sessions: (1) Formation of massive binaries; (2) A life with interactions; (3) Binaries with compact objects; (4) Gravitational waves; and (5) Future facilities. After a broad call that received many answers, the program was finalized around seven invited reviews, 53 contributed talks, and 25 posters. The following articles in this volume constitute the proceedings of these contributions. The variety of their subjects reveals the many aspects that need to be studied to gain a full understanding of the behaviour of massive binaries. While much impressive progress has been achieved in recent years, the current limits of observations and theories were also pointed out, revealing ways for future improvements. Overall, with new facilities and open challenges, the future truly looks bright for the domain of massive multiples.

Acknowledgments

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Further Information

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Author contributions

YN organized the colloquium, chaired its committees, and edited the proceedings for the first two themes (formation and life of massive multiples), EB was part of the SOC and edited the proceedings for the last two themes (XRBs and GWs).

Conflicts of interest

The authors declare that there is no conflict of interest.



Figure 1: The group photo of the 41st LIAC meeting.