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Searching for Stellar Merger Precursors in the Milky Way

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The merger of binary systems has been identified as the cause of peculiar class of astrophysical transients discovered within the last three decades. Archival pre-outburst data on the progenitors of these transients showed an interesting fact: all but one were Hertzsprung gap stars undergoing a phase of fast expansion after hydrogen exhaustion in the core of the more massive component. This quick growth likely initiated an increasingly large mass transfer towards a nearby companion, ending in instability and eventual merger of the binary. Because of the short timescale of this phase, such binary configurations in pre-merger stage are rare. Understanding these binary progenitors is crucial for unraveling the mechanisms driving binary evolution and shedding light on the final fate of such systems.
In this presentation, I will discuss our current knowledge and hypotheses regarding these systems. Additionally, I will present our efforts to identify mass-transferring binaries within the Milky Way using data from Gaia and WISE, focusing on Hertzsprung gap stars sharing several properties with stellar merger progenitors.

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