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Wolf-Rayet –compact object binaries: the road to gravitational wave mergers

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The properties of binaries hosting a Wolf-Rayet star and a compact object (black hole or neutron star) suggest that such systems could be the progenitors of binary compact objects merging via gravitational wave emission. It is difficult to distinctively determine the road leading to these mergers: many stellar and binary physical models are still poorly constrained and introduce uncertainties in the interpretation of the possible formation pathways. With the population-synthesis code SEVN, we quantified the impact of different assumptions on metallicity, common envelope efficiency, core-collapse supernova and natal kick models on the evolution of a binary population representative of the one observed in the Milky Way. Within the considered parameter space and for metallicity $Z \geq 0.0014$, we found that more than 99% of merging binary compact objects had a progenitor in the Wolf-Rayet - compact object configuration. Some of them exhibit properties similar to Cyg X-3, the only Wolf-Rayet –compact object candidate in the Milky Way. Future observations of Wolf-Rayet –compact object systems could be the "Rosetta stone" to calibrate models for the formation of binary compact objects.

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