

# Impact of binary systems on massive star evolution

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In recent years, research on magnetars has become popular, making the search for progenitor stars of rapidly rotating compact objects an important topic. Accreting stars in binary systems can gain additional angular momentum through Roche Lobe Overflow (RLOF) from the donor star, affecting the rotation rate of the accreting star. Therefore, they are considered a way to produce fast rotating compact objects. This study uses MESA to simulate the evolution of massive binary systems and compares it with the evolution of single stars to understand how binary systems influence the progenitors of supernovae. Results show a higher initial rotation rate reduces mass accretion due to the expansion of the orbit. After RLOF, the accretor accelerates, possibly reaching critical rotation. Lower initial rotation has more mass transfer, leading to even greater acceleration. Mass transfer also alters surface helium abundance, making the accretor's composition differ from single star evolved.

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