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ULXs as progenitors of merging compact binary systems

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Using Ultra-Luminous X-ray (ULX) sources as progenitors of compact binary systems, we estimate the coalescence rate of compact binary systems. ULXs are extra-galactic X-ray sources with apparent luminosity $> 10^{39}$ erg/s. They are thought to be accreting NS or BH. The mechanism of how these systems reach such high luminosity is still unknown. 10^{39} erg/s is above the Eddington accretion limit for a $10M_{\odot}$ BH. There are a few explanations for such high luminosities: (1) NS/BH accreting at super-Eddington accretion rate, (2) highly beamed emission, and (3) emission from an intermediate-mass black hole with a mass of $100M_{\odot}$ to 10^5M_{\odot} at sub-Eddington accretion. Observation of some ULX systems suggests NSs accreting with beamed emission with massive companions. Eventually, some of these companion stars will become compact objects, forming compact binary systems which are potential progenitors of gravitational waves and short GRBs. Assuming all merging compact binary systems undergo a ULX phase, we simulate a population of binary stars and follow their evolutionary history. We compute the merger rate from the compact binaries that went through a ULX phase.

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Yes

Level for award;(Hons, MSc, PhD, N/A)?

PhD

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