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Exploring ULXs as Short GRB Precursors

The joint detection of gravitational waves (GW170817) by LIGO and Virgo, together with the short gammaray burst (sGRBs) GRB 170817A observed by Fermi and INTEGRAL, has confirmed that at least some sGRBs originate

from the merger of two neutron stars (NS-NS). Despite this breakthrough, the evolutionary pathways that lead to such

mergers remain uncertain.

In this project, we study the likelihood that a binary system which undergoes a ULX phase will ultimately produce an sGRB. To do this, we use the rapid population synthesis code COSMIC to simulate large ensembles of massive binary systems across a range of metallicities and generate our ULX population. We use a detailed binary evolution code POSYDON to complement these statistical results to model selected ULX systems with more realistic mass transfer physics and common-envelope evolution. Our study aims to quantify the fraction of ULX systems that lead to sGRB-producing compact mergers and to characterize their delay time distributions and likely host galaxy properties.

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None

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Yes, I ACCEPT

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