



- RAY ASTRONOMY 2019

Current Challenges and New Frontiers in the Next Decade

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The demographics and formation rate of X-ray binaries in nearby galaxies

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Characterization of X-ray binaries on the basis of their donor stars allow us to identify their parent stellar populations and measure directly their formation efficiency as function of their age. Combining this information with constraints on the nature of their compact objects allow us to measure the formation rate of compact objects and their demographics in different types of X-ray binaries. These are key parameters for constraining models of massive stellar evolution and understanding the populations of gravitational wave progenitors and short gamma-ray bursts.

We present results from a Chandra-based study of the formation efficiency of X-ray binaries in the Magellanic Clouds and M81, and a systematic study of the compact object populations in nearby galaxies observed with NuSTAR. We find that High-mass X-ray binaries show enhanced formation rates at ages of ~ 30 -60 Myr, with another possible peak around 10 Myr. Our analysis of the compact-object populations indicates that more actively star-forming galaxies host a larger fraction of black-hole systems. Furthermore, we see a clear preference for accreting pulsars to be associated with star-forming regions, in good agreement with similar studies in our Galaxy. Finally, we compare these results with predictions from population synthesis models for different star-formation scenarios.

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

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