



- RAY ASTRONOMY 2019

Current Challenges and New Frontiers in the Next Decade

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Lessons learned from ULX populations and their environment

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Ultraluminous X-ray Sources (ULXs) are off-nuclear point sources exceeding the Eddington limit for an accreting stellar mass black hole. Their high accretion rates challenge our understanding of accretion physics (e.g. beaming, super-Eddington accretion). The nature of their compact objects and their formation channels are of great interest for the single/binary stellar evolution and the nature of the sources dominating the X-ray output of galaxies. Additionally, as potential progenitors of NS/BH mergers they offer an observational window to the past of gravitational wave sources.

We compile a catalog of galaxies in the local Universe (< 200 Mpc) and using multi-wavelength archival data we estimate their distance, star formation rate, stellar mass, metallicity and AGN content. By cross-matching the galaxy sample with the Chandra Source Catalog 2.0, we construct the largest up-to-date census of ULX populations. We probe the rate of ULXs in early- and late-type galaxies and its scaling with stellar mass (one ULX per $\sim 4.5 \times 10^{11} M_{\odot}$) and star formation rate (~ 0.6 ULXs per $M_{\odot} \text{ yr}^{-1}$). Finally, we find a negative correlation between the formation rate of ULXs and the metallicity of their host galaxies in the $8 < 12 + \log(O/H) < 9$ range.

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

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