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How Many Impostors are Among the IMXBs?

Recent endeavors to directly classify the donor star mass of extragalactic X-ray binaries (XRBs) through optical photometric modeling has uncovered an apparent overabundance of XRBs with donor stars with a mass between 3 and 8 solar masses. These so-called 'intermediate-mass XRBs' (IMXBs) make up as many as 30% of the XRBs in nearby spiral galaxies. A population of this size is in contradiction with current XRB evolutionary models, which indicate IMXBs should be extremely short-lived and, thus, rare. One possible explanation for these observations is that these IMXBs actually represent a population of low-mass XRBs that mimic the optical properties of intermediate-mass stars, as is the case with the Galactic low-mass XRB Cyg X-2. To test this hypothesis, I am conducting an analysis of XRBs in nearby elliptical galaxies, whose XRB populations are known to be comprised entirely of low-mass XRBs. Starting with M32 and M105, I will conduct an SED analysis of XRB donor stars using optical HST photometry in search of those with optical luminosities and spectral types that are incompatible with a standard low-mass star. The presence of such sources in elliptical galaxies would suggest that at least some of the IMXBs identified in spiral galaxies are actually over-luminous low-mass XRBs. On the other hand, the lack of this detection may not rule out the possibility that these enigmatic XRBs in spiral galaxies are low-mass, but it will allow us to put observational constraints on the time frame for which low-mass XRBs may host over-luminous donor stars.

Contribution

Oral talk

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