

How Massive can a Stellar Black Hole be? Chandra's multi-observatory time domain study of the IC 10 X-1 binary system Silas Laycock¹

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Abstract

Chandra has observed the massive Black Hole + Wolf-Rayet star X-ray binary IC 10 X-1 repeatedly across its 25 year mission. Synergy between Chandra's unparalleled high-resolution X-ray optics and the other great observatories all operating at the same time, has enabling a detailed time domain study of this fascinating system and its host galaxy's X-ray binary population. IC 10 X-1 exhibits an interaction between the radiation field of the black hole, the wind of the accretion disk, and the stellar wind of the WR star. This manifests as an apparently stable phase-offset between the X-ray eclipse and the radial velocity curves traced by different ion species, which can confound traditional BH mass determinations. Contemporaneous pan-wavelength monitoring data from Gemini, HST (UV), Swift, XMM-Newton will hopefully soon be extended to the infrared by JWST, highlighting Chandra's increased value in the JWST era. IC 10 X-1 serves as a laboratory for studying the progenitors of the most massive black holes.





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