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Early Results from a Deep Chandra Observation of Centaurus A

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We present early results from deep (6x100 ks) Chandra observations of the nearby galaxy Centaurus A. Cen A is the nearest early-type galaxy, late stage merger, and radio galaxy; our deep observations probe a wide range of astrophysically interesting phenomena unobservable in any other galaxy. We explore the nature of the X-ray jet (and counterjet), which is dominated by compact knots within 1 kpc of the nucleus. At larger distances, diffuse emission, which has an unknown acceleration mechanism, dominates. Lateral spectral variations in the jet imply the emission does not originate simply in a sheath that is strongly interacting with the ambient gas. We report the discovery of a surface brightness discontinuity in the interstellar medium that may indicate it is 'sloshing' in the gravitational potential as a result of the galaxy merger. We study the X-ray binary population to luminosities below 10^{36} ergs/s and identify variable sources. In particular, we report the discovery of a second, previously unknown, transient ultraluminous X-ray source and discuss the implications of Cen A having two such sources. Combined with extensive HST/ACS data that accurately measure the structural parameters of the globular cluster (GC) population, we probe the link between low-mass X-ray binaries (LMXBs) and GCs and find that fundamental dependence of LMXBs on GC properties is due to central density and size.

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