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Time Domain Studies of Neutron Star and Black Hole Populations: The Post Chandra and XMM-Newton Era

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We present prospects for studying stellar-origin black hole (BH) and neutron star (NS) populations in nearby galaxies, focusing on science topics that require next generation X-ray telescopes. Time domain measurements of BHs and NSs will revolutionize our understanding of their formation and evolution by linking source characteristics to accretion and galaxy parameters. The central themes include studying gravitational wave merger progenitor populations such as Wolf-Rayet X-ray binaries, elucidating the properties of ultraluminous X-ray pulsars that challenge accepted methods of accretion, and investigating various classes of unique transients (e.g., ultraluminous bursts) that remain unexplained. X-ray identification of compact object types also permits, for example, detailed studies of the role of supernova kicks in the dynamical evolution of X-ray binaries. We will present SIXTE simulations of Athena WFI observations of nearby galaxies and summarize the expected improvement in our understanding of these populations, in addition to other phenomena such as obscured HMXBs and Type I X-ray bursts.

Topic

Multi-messenger and transient astronomy

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