STROBE-X

X-ray Timing & Spectroscopy on Dynamical Timescales from Microseconds to Years

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by relaxing tolerances and stability requirements; by use of a smaller launch vehicle. The starshade would provide excellent exoplanet science performance, but for a smaller number of detected exoplanets of all types, including exoEarth candidates, and a smaller fraction of exoplanets with measured orbits. The full suite of HabEx observatory science is supported. Our approach uses a non-deployed segmented primary mirror, whose manufacture is within current capabilities.

158.11 — STROBE-X: X-ray Timing & Spectroscopy on Dynamical Timescales from Microseconds to Years

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We describe a probe-class mission concept that provides an unprecedented view of the X-ray sky, performing timing and 0.2-30 keV spectroscopy over timescales from microseconds to years. The Spectroscopic Time-Resolving Observatory for Broadband Energy X-rays (STROBE-X) has three key science drivers: (1) measuring the spin distribution of accreting black holes, (2) understanding the equation of state of dense matter, and (3) exploring the properties of the precursors and electromagnetic counterparts of gravitational wave sources. To perform these science investigations, STROBE-X comprises three primary instruments. The first uses an array of lightweight optics (3-m focal length) that concentrate incident photons onto solid state detectors with CCD-level (85-130 eV) energy resolution, 100 ns time resolution, and low background rates to cover the 0.2-12 keV band. This technology is scaled up from NICER, with enhanced optics to take advantage of the longer focal length of STROBE-X. The second uses large-area collimated silicon drift detectors, developed for ESA's LOFT, to cover the 2-30 keV band. These two instruments, with effective areas of 2 m^2 at 1.5 keV and 5 m^2 at 10 keV, respectively, each provide an order of magnitude improvement in effective area compared with its predecessor (NICER and RXTE, respectively). Finally, a sensitive sky monitor triggers pointed observations, provides high duty cycle, high time resolution, high spectral resolution monitoring of the X-ray sky with 20 times the sensitivity of the RXTE ASM, and enables multi-wavelength and multi-messenger studies on a continuous, rather than scanning basis. The STROBE-X mission concept is a rapidly repointable observatory in low-Earth orbit, similar to RXTE or Swift, and will be presented to the 2020 Astrophysics Decadal Survey for consideration as a probe-class mission.

158.12 — Reducing the Athena WFI Background with the Science Products Module: Results from Geant4 Simulations

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The Wide Field Imager (WFI) on ESA's Athena X-ray observatory will include the Science Products Module, a secondary CPU that can perform special processing on the science data stream. Our goal is to identify on-board processing algorithms that can reduce WFI charged particle background and improve knowledge of the background to reduce systematics.