The NuSTAR serendipitous survey: the 40-month catalog and the properties of the distant high-energy X-ray source population - DTU Orbit (31/12/2018)

We present the first full catalog and science results for the Nuclear Spectroscopic Telescope Array (NuSTAR) serendipitous survey. The catalog incorporates data taken during the first 40 months of NuSTAR operation, which provide ~20 Ms of effective exposure time over 331 fields, with an areal coverage of 13 deg², and 497 sources detected in total over the 3–24 keV energy range. There are 276 sources with spectroscopic redshifts and classifications, largely resulting from our extensive campaign of ground-based spectroscopic follow-up. We characterize the overall sample in terms of the X-ray, optical, and infrared source properties. The sample is primarily composed of active galactic nuclei (AGNs), detected over a large range in redshift from $z = 0.002$ to 3.4 (median of $z$), but also includes 16 spectroscopically confirmed Galactic sources. There is a large range in X-ray flux, from to $-11$, and in rest-frame 10–40 keV luminosity, from to 46, with a median of 44.1. Approximately 79% of the NuSTAR sources have lower-energy (<10 keV) X-ray counterparts from XMM-Newton, Chandra, and Swift XRT. The mid-infrared (MIR) analysis, using WISE all-sky survey data, shows that MIR AGN color selections miss a large fraction of the NuSTAR-selected AGN population, from ~15% at the highest luminosities ($\mathrm{erg} \ \mathrm{s}^{-1}$) to $\sim$80% at the lowest luminosities ($\mathrm{erg} \ \mathrm{s}^{-1}$). Our optical spectroscopic analysis finds that the observed fraction of optically obscured AGNs (i.e., the type 2 fraction) is , for a well-defined subset of the 8–24 keV selected sample. This is higher, albeit at a low significance level, than the type 2 fraction measured for redshift- and luminosity-matched AGNs selected by <10 keV X-ray missions.

General information
State: Published
Organisations: National Space Institute, Astrophysics and Atmospheric Physics, Department of Photonics Engineering, University of Durham, California Institute of Technology, Universidad de Concepcion, Pontificia Universidad Catolica de Chile, University of California at Berkeley, Clemson University, Georgia Institute of Technology, Pennsylvania State University, Yale University, National Institute for Astrophysics, Technical University of Denmark, Columbia University, Dartmouth College, Swiss Federal Institute of Technology Zurich, University of Sheffield, NASA Goddard Space Flight Center
Number of pages: 30
Publication date: 2017
Peer-reviewed: Yes

Publication information
Journal: Astrophysical Journal
Volume: 836
Issue number: 1
Article number: 99
ISSN (Print): 0004-637X
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 4.41
Web of Science (2017): Impact factor 8.561
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 5.26
Web of Science (2016): Impact factor 8.955
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): CiteScore 4.8
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): CiteScore 4.57
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): CiteScore 4.85
Web of Science (2013): Impact factor 14.137
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): CiteScore 5.51
Web of Science (2012): Impact factor 16.238
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): CiteScore 5.46
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 2
Web of Science (2010): Impact factor 15.206
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Web of Science (2008): Indexed yes
Web of Science (2007): Indexed yes
Web of Science (2006): Indexed yes
Web of Science (2005): Indexed yes
Web of Science (2004): Indexed yes
Web of Science (2003): Indexed yes
Web of Science (2002): Indexed yes
Web of Science (2001): Indexed yes
Web of Science (2000): Indexed yes
Original language: English
Keywords: Catalogs, Galaxies: active, Galaxies: nuclei, Quasars: general, Surveys, X-rays: general, Supporting material: figure sets, machine-readable tables
Electronic versions: The_NuSTAR_Serendipitous_Survey.pdf. Embargo ended: 11/02/2018
DOIs: 10.3847/1538-4357/836/1/99
Source: FindIt
Source-ID: 2352652930
Research output: Research - peer-review › Journal article – Annual report year: 2017