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SYMPOSIUM ON NEW TECHNOLOGIES FOR FUTURE SPACE ASTRONOMY MISSIONS (A7)
Technology Needs (1) (2)

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TECHNOLOGY DEVELOPMENT NEEDED FOR FUTURE X RAY ASTRONOMY MISSIONS (INVITED)

Abstract

X-ray astronomy is in a privileged situation with the successful missions Chandra and XMM-Newton for more than 10 years in orbit, and Astro-H in the building phase. Over the past 10 years ESA, NASA, and YAXA studies have been made of follow-up missions, like Constellation-X, XEUS, IXO, and ATHENA. This presentation will highlight the technological challenges encountered to build X-ray optics and instrumentation for these types of missions. The optics requires an order of magnitude more collecting area (¿ 5m2) for a few seconds of arc spatial resolution. This drives the focal length of the telescope (25m), and thereby the complexity of the spacecraft. Furthermore new technologies are required to realize such an optic within a reasonable mass. The detectors require significant improvement in field of view (number of pixels), energy resolution, and count rate ability. This tends to be possible by the use of Si-based imaging arrays with a large number of pixels, high detection efficiency, and high count rate ability at one side, and the development of modest imaging arrays of cryogenic sensors with very high energy resolution and good detection efficiency at the other side. The cryogenic detectors require further development of cooling systems based on mechanical coolers, like employed for the 1st time on Planck, and planned for Astro-H. The biggest challenge for the realization of such a mission is however not technical. That challenge is that the realization of this future X-ray astronomy mission will require coordination between scientists and Space Agencies on a Global scale.