

velous false-color images derived from these x-ray data again demonstrates that there is much more happening in outer space than is directly visible.

This gallery of informative new images covers a wide variety of astronomical settings, ranging from familiar objects in the Solar System, such as the Moon and comets, to the structure of currently active galactic nuclei and the identification of similar beacons at earlier epochs of the universe, when galaxies were young. In between, the book's authors, Bernd Aschenbach, Hermann-Michael Hahn and Trümper, have given us highly structured images of the hot interstellar medium in our galaxy and others, showing us the lasting imprint of past explosive events. Beautiful x-ray images of supernova remnants reveal the sites of cosmic-ray acceleration. Unique to x-ray astronomy are the spectacular images of the hot intergalactic plasma in clusters of galaxies, directly tracing the gravitational potential wells characteristic of such systems.

This collection is not the first set of astronomical images obtained with a grazing-incidence x-ray telescope. To my knowledge, however, it is the only one based on full coverage of the sky. The coffee-table-book format used here—identical to that used by the same publisher for *Hubble: A New Window to the Universe* by Daniel Fischer and Hilmar Duerbeck (1996)—includes considerable historical background and broad astrophysical context.

*The Invisible Sky* presents an excellent, detailed account of the German x-ray astronomy program leading up to and including ROSAT; programs in x-ray astronomy elsewhere, however, get relatively scant coverage. The presentation fails to reflect adequately the remarkably open international quality that has been the hallmark of x-ray astronomy. For example, there is only cursory mention of the two most relevant complementary companions to ROSAT (and its potential follow-up observatories): the successful Japan-US ASCA (Advanced Satellite for Cosmology and Astrophysics) grazing-incidence x-ray telescope (launched on 20 February 1993), which has provided relatively high spectral resolution over an extended band pass (0.4–12 keV) at moderate spatial resolution; and NASA's HEAO-1 all-sky scanning mission, which has provided unique broadband (0.1 keV–1 MeV) surface brightness spectral data, albeit with relatively crude nonimaging angular resolution. It was the full-sky coverage of HEAO-1 that, in 1980, made possible the use of scanning data from this mission for mapping a region suffi-

ciently large to identify the first interstellar "super-bubble," that in Cygnus; in particular, this extensive feature was discovered with mechanically collimated counters, not with the imaging telescope cited in the book.

The x-ray sky is dominated by an as-yet-unresolved extragalactic cosmic background, most of which resides at photon energies an order of magnitude above the band pass of ROSAT. As discussed in the book's epilogue, the next major German x-ray satellite, planned for launch in 1999, is called ABRIXAS (A Broad-band Imaging X-ray All-sky Survey); it will extend the ROSAT survey into shorter wavelengths (down to ~1 Å), building on the experience and results obtained with ASCA and HEAO-1, especially in regard to the extragalactic hard-x-ray sky. Based on the clues already provided by these results, we should anticipate many revealing—and some surprising—new views of the sky at the beginning of the next decade from such major upcoming x-ray observatories as ABRIXAS, AXAF (NASA's Advanced X-ray Astrophysics Facility), XMM (the European Space Agency's X-ray Multi Mirror mission) and the Japan-US Astro-E x-ray observatory. In effect, this book of beautiful ROSAT images is an inviting foretaste of what should be a particularly splendid era for x-ray astronomy, one yielding much exciting new astrophysics.

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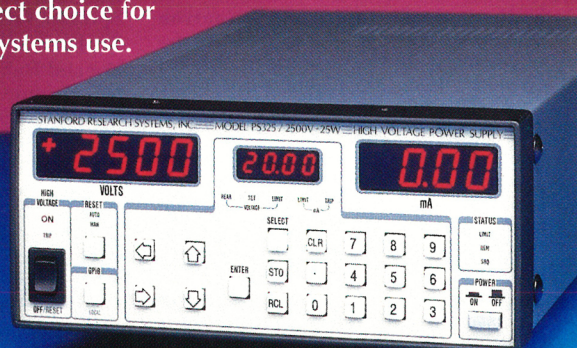
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