

Preface

X-ray astronomy has seen many revolutionary trends since the discovery of the first X-ray source in 1962. Starting as a part of cosmic ray research with the early experiments using rockets and balloons, it has acquired a leading place in the mainstream Astronomy and Astrophysics. The first path breaking event took place in 1970 with the launch of the UHURU satellite. The first technological breakthrough came with the launch of the Einstein satellite in 1978, which for the first time employed the principle of focusing optics in the low energy X-ray region. The X-ray sky today is dotted with sources, which are 17 magnitudes fainter than Sco X-1, the first discovered source. A wealth of observational data has been produced since then, on the entire ensemble of visible and invisible universe. But still by no means is one close to a complete understanding of the complexities of temporal and spectral properties of the large variety of X-ray sources. Due to limitations of the available technology of detecting high energy photons, the energy band above 20 keV is still poorly explored. The most recent trend in the efforts to unlock the mysteries of our universe is the ‘multi-wavelength’ approach which can give a more complete picture of the X-ray sources and emission mechanisms.

Experimental work in X-ray astronomy at the Tata Institute of Fundamental Research (TIFR) started in 1966, using balloon borne instruments in the energy band of 20 – 100 keV region. Rocket-borne soft X-ray surveys (0.15 – 2 keV) were conducted by the group during 1972 – 1982. An all sky monitor to detect transient sources and study the time variability of steady X-ray sources in the energy range 2 – 20 keV was fabricated by the group and launched on board the second Indian satellite, Bhaskara, in 1979. Our next opportunity for a space borne payload arose in 1996 by the launch of the Indian X-ray Astronomy Experiment (IXAE) on board IRS-P3 satellite carried by an Indian Rocket. In view of the success of IXAE, a dedicated astronomy satellite named ‘ASTROSAT’ has been approved by the Indian Space Research Organization. Keeping with the present day trend and capabilities of the Indian launcher, the new satellite will be configured for multiwavelength observations of X-ray sources.

It seemed to several of us in the group that it would be the most appropriate time to hold an international symposium to take stock of the recent developments in the X-ray astronomy with a particular emphasis on multi-wavelength observations. A four day symposium entitled ‘Multi-colour Universe’ was thus held during September 11 – 14, 2001 at Tata Institute of Fundamental Research, Mumbai with the main aim of educating ourselves about the enormity of the discipline and the emerging priorities for coming decades. The programme consisted of invited reviews, contributed talks and poster sessions.

Another motivation to host this symposium was to felicitate our esteemed colleague Prof. P. C. Agrawal on attaining the age of sixty. Prof. P. C. Agrawal, commonly known as ‘Prahlaad ji’ to his close friends had a leading role in the X-ray astronomy group at TIFR since its inception. Energetic as ever, he has provided a strong leadership and motivation to the group members for the last 40 years and the recent approval

of 'ASTROSAT' is entirely due to his efforts. We look forward to his dedicated and guiding role in the future. The special 'ASTROSAT' session held on day 3 of the symposium, was specifically arranged as a tribute to the contribution of Professor P. C. Agrawal to X-ray astronomy in India.

The proceedings of this Symposium are clearly representative of present day understanding of the X-ray universe. The large number of invited talks and the contributory papers illustrate the depth and breadth of the entire field. Various suggestions from the members of the scientific organizing committee made this programme possible. The presentations were divided into three broad categories, the Galactic sources (Black hole and neutron star X-ray binaries, CVs, SNRs and stars), the extragalactic X-ray sources (Galaxies, AGNs, Quasar, X-ray background and clusters of galaxies and third, new technologies and future missions. The symposium was attended by 140 participants with a total of 40 invited talks, 6 contributed talks and 60 poster papers. A selection of these papers, after suitable refereeing, are published in this issue of JAA. We wish to thank the Indian Academy of Sciences for agreeing to publish these papers in JAA and Hema Wesley of the Academy staff for editorial help.

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