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Recent Results and Perspectives of X-ray and Gamma-ray Astronomy *

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Abstract. Chandra with its exquisite angular resolution and XMM-Newton with its stunning throughput and band-pass are two outstanding X-ray observatories that have given and are giving crucial contributions to our understanding of physical phenomena at work from the nearest to the farthest region of Universe, e.g. in fully convective brown-dwarfs, embedded protostars and young stars in star formation regions, active galaxy nuclei, galaxies and clusters of galaxies, gamma-ray bursts, etc. More recently INTEGRAL has open a new window on the hard X-ray and gamma-ray sky detecting since its early observations a wealth of sources including some GRBs. X-rays and Gamma-rays are telling us about the cosmic cycle of matter from the early Universe till the present day interstellar medium enriched by Supernova explosions. X-rays and Gamma-rays are essential for understanding the violent phenomena occurring in celestial objects under extreme physical conditions that cannot be reached within the present-day solar system. In the next coming years, while Chandra, XMM-Newton and INTEGRAL will continue to provide superb X-ray data, a national mission, AGILE, devoted to the study of the gamma-ray sky, will enter into operation, soon followed by the NASA gamma-ray mission, GLAST, realized with an important hardware contribution by Italian INFN and INAF groups. The next decade will be marked by the launch, currently planned for 2013, of the NASA X-ray astronomy mission Constellation-X, a group of four identical satellites placed in orbit around a Lagrangian point and planned to study the same region of the sky with an angular resolution of 10"-20", obtaining X-ray spectra up to about 80 keV. The Hard X-ray mirror modules are an important foreseen contribution of the Italian community to this large X-ray observatory, togheter with a possible partecipation to the focal-plane detectors based on micro-calorimeters. The European X-ray astronomy community together with the Japanese community is envisaging an ambitious X-ray observatory, XEUS, that with a planned angular resolution of few arcsec and a focal length of 50 meters will be a world-class facility for the astronomy community beyond 2020.
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Key words. X-ray Astronomy – Gamma-ray Astronomy – Instrumentation

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