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## X-ray diagnostics and technologies for High Energy Astrophysics

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High energy radiation from celestial objects is one of the most powerful diagnostic tools to access and understand the mechanisms underlying the most energetic and violent phenomena in our Universe. The X-ray range (0.5-20 keV) is particularly suitable for this investigation thanks to a mature detector and optics technology. Spectral, timing and polarimetric radiation signatures at these energies offer a direct access to plasma in environments hosting extreme conditions of gravity, density or magnetic field.

The need for high sensitivity spectroscopic, timing and polarimetric experiments has inspired in the last years intensive R&D programs focused on the development of innovative imaging photoelectric polarimeters and fast, pixelated and large-area Silicon Drift Detectors (SDDs). These activities, carried out by the Italian National Institutes for Astrophysics (INAF) and Nuclear Physics (INFN), has led to the design, production and test of several space instruments on upcoming or future space missions.

In this paper I will report about the most recent developments in the field, highlighting their innovative and multi-disciplinary aspects.

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