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The properties of the soft excess in the transient X-ray binary pulsars of the Small Magellanic Cloud

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The spectrum of X-ray accreting pulsars is usually well described by a hard power-law model, although several sources show also a significant soft excess at low energies. This feature is essential to investigate the physical processes on-going in accreting sources and can be ontained only through high-quality spectral data for such pulsars. To this aim, the best targets to observe are the transient accreting pulsars in the Small Magellanic Cloud: they can reach luminosities up to 10^{38} erg s^{-1} during their outbursts and, because of the low Galactic interstellar absorption in the SMC direction, they can provide high count-statistics spectra at low energies. In the last five years, we have observed with *XMM-Newton* large outbursts of four different pulsars in the SMC. Thanks to the high throughput and spectral resolution of *XMM-Newton*, these observations allowed us to investigate very deeply their spectral and timing properties at soft X-ray energies. In all cases, we detected a pulsating and low-temperature blackbody component, which can be ascribed to the reprocessing of the primary X-ray emission by the optically thick material at the inner edge of the accretion disk. Moreover, in one source we observed also a steady, hot thermal plasma component, which is very likely due to a diffuse collisionally-heated gas far from the accretion region. Finally, in all sources the RGS spectrum shows several narrow emission and absorption features: they cannot be attributed to the thermal plasma, but may be related to the photo-ionized matter located around the accreting source.

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

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