



X-RAY ASTRONOMY 2019

Current Challenges and New Frontiers in the Next Decade

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A broad-band analysis of GRS 1758-258 using long-term spectra collected by the INTEGRAL satellite

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GRS 1758-258 is a bright and persistent hard X-ray source discovered in 1990. It is a low mass X-ray binary whose companion star nature remains uncertain due to the system's location close to the galactic centre and the large interstellar absorption. The presence of a double-sided jet points towards a microquasar character of the source. Frequent observations of GRS 1758-258 by the INTEGRAL satellite since 2003 resulted in a large data set in the 3-400 keV band. Using the 22-100 keV spectra summed over each satellite orbit (~3 days) we characterized an overall variability of the source in terms of the flux and spectral slope. Whereas the 22-100 keV flux varies by more than order of magnitude, the photon index remains very stable and concentrated around the value 1.7, with a tendency towards steeper spectra seen only for a few periods of very low flux levels.

For a deeper study of the GRS 1758-258 emission with a physical model we prepared four broad-band (3-400 keV) spectral sets summed according to the level of the orbital flux. These spectra were analyzed with a hybrid Comptonization model allowing us to characterize the plasma region in the system centre. Our results show that the plasma is photon-starved, with relatively low energy of the seed photons. Together with the presence of weak Compton reflection these findings are consistent with the truncated accretion disc model. In addition, we found that the spectra are affected by a strong, local absorption. The three higher flux spectra sets exhibit similar properties. On the other hand, the low flux state emission is less absorbed and strongly reduced above 200 keV. Finally, we compare our results with those found for other black hole systems, persistent and transient.

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

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