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Spectral and timing properties of GX 17+2 using AstroSat and NICER simultaneous view

We report the analysis of the Z-track neutron star (NS) low-mass X-ray binary (LMXB) GX 17+2 using the simultaneous data from the AstroSat (LAXPC/SXT) and NICER mission data. On segmenting the hardness intensity diagram (HID) into three slices—horizontal branch (HB), hard apex (HA), and normal branch (NB)-we investigate the variability of the source and its spectral state evolution throughout the observation. We performed broadband X-ray spectroscopy in a wide energy range utilizing the soft X-ray observation of NICER & SXT/AstroSat and the hard X-ray observation of LAXPC/AstroSat. The source is found to be in a soft state with a photon index > 2 and tends to be in a softer state along the branches. We performed the timing analysis in all the branches separately to probe the presence of aperiodic variability. We determined the photon lag behavior, which is found to follow a hard lag trend. The fractional root mean square variability shows a decreasing variability trend along the branches from HB to NB via HA. We also represent the variation of the spectral parameters like the coronal temperature, photon index, blackbody temperature, and other obtained parameters along the track. Then, we compare the results of the two missions.

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