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| Title: | A broad-band look of the accreting millisecond X-ray pulsar SAX J1748.9−2021 using AstroSat and XMM–Newton |
| Authors: | Beri, A. (/jspui/browse?type=author&value=Beri%2C+A.) |
| Keywords: | Accretion<br>Accretion discs<br>Stars: neutron<br>X-rays: binaries |
| Issue Date: | 2020 |
| Publisher: | Oxford Academic |
| Citation: | Monthly Notices of the Royal Astronomical Society (3), pp. 4361-4368 |
| Abstract: | SAX J1748.9−2021 is a transient accretion powered millisecond X-ray pulsar located in the globular cluster NGC 6440. We report on the spectral and timing analysis of SAX J1748.9−2021 performed on AstroSat data taken during its faint and short outburst of 2017. We derived the best-fitting orbital solution for the 2017 outburst and obtained an average local spin frequency of 442.361098(3) Hz. The pulse profile obtained from 3 to 7 and 7 to 20 keV energy bands suggest constant fractional amplitude ∼0.5 per cent for fundamental component, contrary to previously observed energy pulse profile dependence. Our AstroSat observations revealed the source to be in a hard spectral state. The 1–50 keV spectrum from SXT (Soft X-ray Telescope) and LAXPC (Large Area X-ray Proportional Counter) on-board AstroSat can be well described with a single temperature blackbody and thermal Comptonization. Moreover, we found that the combined spectra from XMM–Newton (EPIC-PN) and AstroSat (SXT + LAXPC) indicated the presence of reflection features in the form of iron (Fe Kα) line that we modelled with the reflection model xillvercp. One of the two X-ray burst observed during the AstroSat/LAXPC observation showed hard X-ray emission (>30 keV) due to Compton up-scattering of thermal photons by the hot corona. Time-resolved analysis performed on the bursts revealed complex evolution in emission radius of blackbody for second burst suggestive of mild photospheric radius expansion. |
| Description: | Only IISERM authors are available in the record. |
| URI: | https://academic.oup.com/mnras/article/492/3/4361/5706851 (https://academic.oup.com/mnras/article/492/3/4361/5706851)<br>http://hdl.handle.net/123456789/3376 (http://hdl.handle.net/123456789/3376) |
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