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Title:	AstroSat observations of the first galactic ULX pulsar swift J0243.6+6124
Authors:	Beri, A. (/jspui/browse?type=author&value=Beri%2C+A.) Singh, Kulinder Pal (/jspui/browse?type=author&value=Singh%2C+Kulinder+Pal)
Keywords:	Pulsars: individual: (Swift J0243.6+6124) X-rays: binaries
Issue Date:	2020
Publisher:	Oxford University Press
Citation:	Monthly Notices of the Royal Astronomical Society, 500(1), pp. 565-575.
Abstract:	Swift J0243.6+6124, the first Galactic ultraluminous X-ray pulsar, was observed during its 2017–2018 outburst with AstroSat at both sub- and super-Eddington levels of accretion with X-ray luminosities of $L_X \sim 7 \times 10^{37}$ and 6×10^{38} erg s $^{-1}$, respectively. Our broad-band timing and spectral observations show that X-ray pulsations at ~ 9.85 s have been detected up to 150 keV when the source was accreting at the super-Eddington level. The pulse profiles are a strong function of both energy and source luminosity, showing a double-peaked profile with pulse fraction increasing from ~ 10 per cent at 1.65 keV to 40–80 per cent at 70 keV. The continuum X-ray spectra are well modelled with a high-energy cut-off power law ($\Gamma \sim 0.6$ – 0.7) and one or two blackbody components with temperatures of ~ 0.35 and 1.2 keV, depending on the accretion level. No iron line emission is observed at sub-Eddington level, while a broad emission feature at around 6.9 keV is observed at the super-Eddington level, along with a blackbody radius (121–142 km) that indicates the presence of optically thick outflows.
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