

Detection of a Type-I X-ray thermonuclear burst from GX 3+1 through AstroSat Biplob Sarkar^{1,*}

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We report the results of an observation of the low mass X-ray binary GX 3+1 with AstroSat's LAXPC and SXT instruments onboard. We detect a short Type-1 thermonuclear burst (15 s) present in the LAXPC 20 light curve and our study of the hardness-intensity diagram reveals that the source to be in a soft banana state during the observation. We systematically obtain a joint pre-burst spectra of 841 s for a simultaneous observation of SXT and LAXPC 20 instruments and a 17 s of individual burst spectrum from LAXPC 20. A disk blackbody plus a thermal Comptonization model combination is used to obtain the parameter values of accretion disk and corona from the pre-burst spectra. We attempt to fit the burst spectrum with a blackbody model added to firstly, a power law with a high energy exponential roll off and secondly, a thermally Comptonizing component. We achieve an average blackbody temperature of 1.62 ± 0.05 keV and an average burst unabsorbed flux of 1.3×10^{-8} ergs s⁻¹ cm⁻². Using normalization values of the blackbody spectrum, we estimate an average radius of 6.64 ± 0.4 km of the neutron star, assuming a best source distance of 6.1 kpc. Finally, we discuss about the detection of a Type-1 burst from GX 3+1 and compare the results with published literature reports.