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X-ray Properties of the BHC MAXI J0637-430 during its 2019-20 Outburst

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In 2019–20, the transient Galactic black hole candidate MAXI J0637–430 saw its first outburst. Between November 2019 and May 2020, this outburst was active for almost six months. Using archival data from the NICER, Swift, and NuSTAR satellites, we examine the spectral characteristics of this source during that outburst. We examined the source throughout the course of six epochs where Swift/XRT-NuSTAR and NICER-NuSTAR data were simultaneously available. We examined the spectrum data in the large 0.7-70 keV energy band using phenomenological and physical model fitting methods. Disk blackbody with power-law, disk blackbody with broken power-law, and disk blackbody with power-law and bmc models were first combined. We employed the two-component advective flow (TCAF) model with broken power-law, TCAF with power-law, and bmc models to better comprehend the accretion image, such as how the accretion rates change with the changing size of the apparent Compton cloud. The diskbb+power-law and TCAF models were successful in spectrally fitting the data for the last three epochs with acceptable χ^2/DOF. We required an additional component to fit spectra with acceptable χ^2/DOF for the first three epochs, though. According to our study, during the first three epochs, while the source was in the high soft state, another component may have been present. The bulk motion Comptonization phenomenon is the best way to explain this additional component in this state. We calculated the average mass of the source to be $8.1^{+1.3}_{-2.7}M_{\odot}$ using the TCAF model fitting.

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