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Observing the Hypersoft State of Cygnus X-3 with XRISM and Chandra

In March 2024 Cygnus X-3 (Cyg X-3) was in a quenched/hypersoft state (soft/high). During this state a 67 ksec XRISM observations was triggered along with ToO observations with the SMA. During this period there were also supporting observations being made with AMI (radio), NuSTAR (hard X-ray), and Fermi (gamma-ray). The SMA submillimeter observation taken during the XRISM observation revealed that Cyg X-3 was at an extremely low flux level (~3.8 mJy @ 225.53 GHz) indicating that the jet had basically turned off. SMA observations done 2 and 3 days later showed flux density exceeded 1 Jy (@1.3 mm) indicating a major flare was underway. The XRISM observations showed a rich spectrum with the detection of multiple kinematic and ionization components in absorption and emission whose superposition leads to complex line profiles, including strong P Cygni profiles on resonance lines. The prominent Fe XXV He alpha and Fe XXVI Ly alpha emission complexes are clearly resolved into their characteristic fine-structure transitions. In this presentation we will present some of the XRISM spectral results and put them in the context of the multi-wavelength campaign which was in place for these observations. Also we present a comparison of the XRISM observations with previously made Chandra HETG observations of the hypersoft state.

Contribution

Oral talk

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