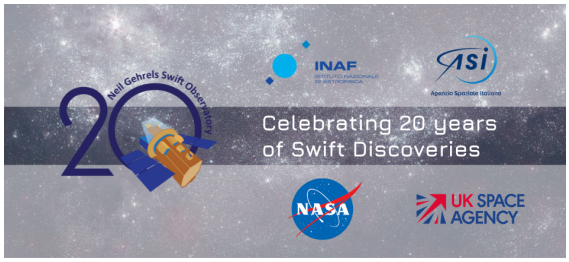

Contribution ID: **95** Type: **Poster**

Long-Term X-ray Activity of GRS 1915+105 studied with Swift and MAXI

Tuesday 25 March 2025 14:29 (1 minute)

GRS 1915+105 is one of the brightest black hole X-ray binaries (BHXBs) since it was first detected by GRANAT/WATCH in 1992 until it faded into a quiescent state in recent years. We studied its long-term activity using MAXI/GSC and Swift/BAT data for the duration of 2009 –2019, the last ten years of its active state. We found that the 10 years'activity of GRS 1915+105 can be classified into four distinct spectral branches in the hardness-intensity diagram drawn with the MAXI/GSC and Swift/BAT bands. We named these branches the diagonal branch, the soft branch, the faint branch, and the quiescent branch based on their positions in the diagram. These branched can be also identified in the X-ray light curves, with each of them lasting for months to years. Although it is not straightforward to compare it with the "spectral states"found in the canonical "q-shaped" hardness intensity diagram often drawn for the outbursts of transient BHXBs, we find that the soft branch of GRS 1915+105 has similarities to the high/soft state of canonical BHXBs where the disk emission is dominant, while the faint branch is like the low/hard state where corona emission dominates. The diagonal branch, however, is difficult to interpret in the standard framework of BHXBs.
We can extend this study using the light curves of RXTE/ASM, Swift/BAT and CGRO/BATSE in the preceding periods 1992 –2009 and found that the total 27 years'X-ray activity of GRS 1915+105 is consistent with this four-branch classification.

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Session Classification: Poster Session