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Search for neutrino emission from Microquasars with KM3NeT/ORCA detector

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Microquasars are galactic binary systems that present non-thermal acceleration mechanisms. These systems are thought to consist of a compact object and a companion star, leading to the formation of an accretion disk similar to those in quasars.

The composition of microquasar jets remains uncertain. However, neutrino production becomes a possible outcome if protons are present in situ. Detecting neutrinos from microquasars would not only provide insights into their jet composition but also establish them as potential sources of galactic cosmic rays.

KM3NeT/ORCA, a neutrino telescope located at the bottom of the Mediterranean Sea near La Seyne-sur-Mer, France, is capable of detecting such neutrinos in the GeV-multiTeV energy range. Data collection began in early 2020 and will continue throughout its construction until it reaches full detection capability.

This study presents a search for neutrinos emitted by microquasars using the full KM3NeT/ORCA dataset, leveraging multiwavelength observations. The analysis focuses on outburst periods to minimize atmospheric background, employing machine-learning techniques to filter out likely atmospheric events. Finally, the results are compared with theoretical expected fluxes and upper limits given by other neutrino experiments.

Collaboration(s)

KM3NeT

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