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Results of the long-term campaign on Cygnus X-3 with the MAGIC telescopes

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Cygnus X-3 is a microquasar consisting of a compact object of unknown nature and a Wolf-Rayet star, which orbit each other with a very short period of 4.8 hours. The compact object launches powerful jets that are an excellent site for particle acceleration up to relativistic energies. The presence of these relativistic particles, combined with the proximity to the star and its high luminosity, makes the conditions in the source very favorable for inverse Compton scattering of stellar photons by the jet electrons, resulting in gamma-ray emission. Cygnus X-3 has been detected in a broad frequency range, from radio to gamma rays above 100 MeV, although it has never been confirmed as a very-high-energy (VHE; above 100 GeV) gamma-ray emitter. Studies of microquasars in gamma rays have recently become a hot topic in the community after the LHAASO detection of four microquasars above 100 TeV, establishing these sources as potential contributors to the Galactic cosmic-ray spectrum at energies above the PeV.
Due to the scientific interest of the source, the MAGIC telescopes have observed Cygnus X-3 in the VHE band for more than a decade. In this contribution, we present a long-term analysis of 130 h collected by MAGIC between 2013 and 2024. This represents the largest available dataset (in both exposure and time coverage) at VHE to date, resulting in the strongest VHE upper limits of the source between 100 GeV and a few TeV. Both the temporal and spectral constraints of Cygnus X-3 during this 11-year period will be interpreted within the multi-wavelength context, providing meaningful constraints on the source properties based on its (lack of) emission in gamma rays at different energies.

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