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Multimessenger emission from the microquasar V4641 Sgr

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Very high-energy gamma-ray emission from the microquasar V4641 Sgr with energy up to beyond 100 TeV has been recently detected with the H.E.S.S., HAWC, and LHAASO observatories. The gamma-ray emission reveals a puzzling 200-parsec-long structure significantly misaligned with its radio jet. We propose that this gamma-ray structure is produced by high-energy cosmic-ray particles escaping from the microquasar along ordered field lines of the Galactic Magnetic Field and interacting with the interstellar medium. If the gamma-ray emission is produced by interactions of high-energy cosmic ray nuclei, the system is detectable by future multi-km³ neutrino detectors. Finally, we argue that gamma-ray observations of jet-like features adjacent to high-energy sources in the Milky Way provide a new method to measure the regular and turbulent components of the Galactic magnetic field at different locations in the Milky Way.

Collaboration(s)

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