

## Gamma-ray heartbeat powered by the microquasar SS 433

*Monday, April 12, 2021 6:45 PM (15 minutes)*

Microquasars, the local siblings of extragalactic quasars, are binary systems comprising a compact object and a companion star. By accreting matter from their companions, microquasars launch powerful winds and jets, influencing the interstellar environment around them. Steady gamma-ray emission is expected to rise from their central objects, or from interactions between their outflows and the surrounding medium. The latter prediction was recently confirmed with the detection at the highest (TeV) energies of SS 433, one of the most interesting microquasars known. We analyzed more than ten years of GeV gamma-ray data on SS 433. Detailed scrutiny of the data reveal emission associated with a terminal lobe of one of the jets and with another position in the SS 433 vicinity, co-spatial with a gas enhancement. Both gamma-ray sources are relatively far from the central binary, and the latter shows evidence for a periodic variation at the precessional period of SS 433, linking it with the microquasar. This result challenges obvious interpretations and is unexpected from any previously published theoretical models. It provides us with a chance to unveil the particle transport from SS 433 and to probe the structure of the local magnetic field in its vicinity.

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**Session Classification:** Exploring the Galaxy: Binaries

**Track Classification:** Binaries