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H.E.S.S. observations of LS 5039

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LS 5039 is a gamma-ray binary system observed in a broad energy range, from radio to TeV energies, which exhibits both flux and spectral modulation folded on its orbital period of ~ 3.9 -d. The X-ray and very-high-energy (VHE, $E > 100$ GeV) gamma-ray fluxes display a maximum/minimum at inferior/superior conjunction, with spectra becoming respectively harder/softer, a behavior which is completely reversed in the high-energy domain (HE, $0.1 < E < 100$ GeV). The GeV spectrum cuts-off at a few GeVs, with a new hard component emerging at $E > 10$ GeV that is compatible with the low-energy tail of the TeV emission. The low 10 – 100 GeV flux, however, makes the GeV and TeV components difficult to reconcile within a single particle population emitting scenario. Here we report on new observations of LS 5039 conducted with the H.E.S.S. telescopes from 2009 to 2015. This new data set allows for an unprecedentedly-deep phase-folded coverage of the source at TeV energies, as well as an extension of the VHE spectral range down to ~ 100 -GeV. Our results will be discussed in the context of VHE emission/absorption processes operating in the system and its connection with the emission observed at X-ray and GeV energies.

Collaboration

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