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Study of the region in the vicinity of SNR G312.4-0.4 with H.E.S.S. and Fermi-LAT

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The region corresponding to the Centaurus Galactic spiral arm tangent of our galaxy, within 1 deg radius around Galactic longitude 312° , harbours a rich environment with candidate sources for gamma-ray astronomy. In particular, it contains five pulsars, with spin-down powers ranging between 10^{35} and 10^{37} erg.s $^{-1}$, and characteristic ages between 13.6 and 62.8 kyr. The possible presence of associated pulsar wind nebulae (PWNe), could provide insights into the transition between the evolutionary stages of a PWN to a pulsar halo. In addition, this field contains SNR G312.4-0.4, a shell-type supernova remnant (SNR) detected at radio wavelengths. It is spatially coincident with the positions of PSR J1413-6141 and PSR J1412-6145, and the inferred characteristics of this SNR indicate that it is in the Sedov-Taylor phase.

In this contribution, we present a detailed spectro-morphological analysis of this region using more than 100 hours of H.E.S.S. observations and 14 years of Fermi-LAT data. We focus on the detection of high-energy gamma-ray emission spatially coincident with the SNR G312.4-0.4 seen by Fermi-LAT, and the detection of two extended sources of very-high-energy gamma-rays around the intermediate-aged pulsars PSR J1413-6205 and PSR J1406-6121 observed by H.E.S.S.. Finally, we discuss the origin of the detected gamma-ray emission in the context of those astrophysical sources and their evolution stages.

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