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Spatially resolved TeV emission from the jets of the microquasar SS 433

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The microquasar system SS 433 provides a unique opportunity to study mildly relativistic collimated jets in our own Galaxy. From its core, a binary system hosting a stellar-mass black hole, two persistent, semi-relativistic jets are launched, almost perpendicular to the line of sight. X-ray observations reveal that these jets extend out to around 100 pc on either side of the central system, terminating at the radio structure W50. The jets of SS 433 were recently reported to be a source of TeV gamma-rays by the HAWC collaboration. I will report the results of deep observations of this system with the H.E.S.S. array of telescopes, resulting in the first detection of the system by an Imaging Atmospheric Cherenkov Telescope array.
To fully exploit the capabilities of the H.E.S.S. observations, a new approach to background rejection was deployed, which I will briefly describe. It is based on the detection of Cherenkov light from muons by large Imaging Atmospheric Cherenkov Telescopes (IACTs), such as the telescope located at the center of the H.E.S.S. array. The application of this technique leads to a factor four reduction in background above several tens of TeV in the H.E.S.S. stereoscopic analysis.
The superior energy and angular resolution of the H.E.S.S. array compared to HAWC allow for a detailed study of the morphology and spectral energy distribution of the gamma-ray emission in the jets, including a measurement of the physical extension of the emission and of the spectra of the jets out to tens of TeV. This measurements are put in the context of the multi-wavelength emission from the jets to constrain the properties of the high energy particle population responsible for the emission.

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