Search for dark matter annihilation signals from unidentified Fermi-LAT objects with H.E.S.S.

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Cosmological N-body simulations show that Milky-Way-sized galaxies harbor a population of unmerged dark matter subhalos. These subhalos could shine in gamma rays and be eventually detected in gamma-ray surveys as unidentified sources. In the Fermi-LAT catalogue of sources detected above 10 GeV we identified three unidentified Fermi-LAT objects (UFOs) which are missing multiwavelength counterparts and characterised by hard GeV spectrum. Such properties of sources make them good candidates to be clumps of annihilating WIMP dark matter. Here we report the results of UFOs' observations with H.E.S.S. at energies above 100 GeV.

In absence of the detection of any of these objects or the combined emission from all UFOs we report the constraints on the product of the velocity-weighted annihilation cross-section by the J-factors of these objects. Assuming that WIMPs are characterised by thermal annihilation cross-section and follow the mass distribution predicted by N-body cosmological simulations we found that only light, ~0.3 TeV, WIMP dark matter can marginally explain the observed multiwavelength emission from these objects.