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In search of TeV halos, new astrophysical objects to reveal our gamma sky map

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TeV halos are astrophysical objects recently discovered by the H.A.W.C. which extend around pulsars. These sources are electron and positron accelerators that interact with the surrounding magnetic field. Their recent detection is due to the fact that they are only visible in the gamma ray region, their size represents several degrees in the sky and they are very faint. To study them, it is therefore necessary to have instruments that are both very sensitive and have a wide field of view, which is technically difficult to achieve. However, their study is important because they dominate TeV emissions in the galaxy and compete with dark matter in explaining the observation of an excess of positrons arriving on Earth.

Today some of these objects are revealed by the array of imaging atmospheric Cherenkov telescopes H.E.S.S. but the construction of the new array CTA, ten times more sensitive, and the implementation of an associated analysis system could reveal hundreds of them and thus allow us to better understand our sky map in gamma. This presentation aims to understand what is the nature of TeV halos, how do they evolve, with which instruments do we detect them and how do we analyze them? This will be done by approaching gamma astronomy and particle accelerators in astrophysics more broadly.

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