

Finding Pulsar TeV halos among VHE sources

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Recent very-high energy (VHE) observational studies have indicated the presence of the so-called TeV halos around several nearby middle-aged pulsars. Follow-up theoretical studies point out the possible general existence of the TeV halos, although under debate. If they generally exist as suggested, they would contribute significantly to cosmic positrons/electrons in our Galaxy. The full operation of Chinese LHAASO WCDA and KM2A turns out to have provided a valuable source list for finding (candidate) TeV halos. Here we report our series of work that have identified more than 10 (candidate) pulsar TeV halos, mostly among the LHAASO source list. Measurements or data from other VHE facilities, Fermi Gamma-ray Space Telescope, and major X-ray telescopes are used in our identification. Combining our results with previous ones about TeV halos, we are able to draw several features of them, and will report them in this talk. These include the estimated efficiency of converting pulsars' spin-down energies to TeV-halo emissions, and its likely independence on pulsars' characteristic ages. We will also discuss their possible extension and spectral properties, while the latter may be used to differentiate them from the other type of pulsar-related TeV emitters, the pulsar wind nebulae.

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