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Unraveling Geminga TeV halo with the Cherenkov Telescope Array

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Galactic pulsars, such as Geminga, are surrounded by a bright and extended TeV emission. This radiation is compatible with multi-TeV electrons scattering off low-energy photons via the inverse-Compton scattering process. To date, about 10 TeV halos have been observed around known pulsars. Next-generation gamma-ray detectors, such the Cherenkov Telescope Array (CTA), will have unprecedented sensitivity to the extended emission around pulsars. In this talk I will illustrate how CTA will enable us to unravel with extraordinary precision some key properties of Geminga and its surrounding environment, including the injection spectrum, the spin down luminosity and the diffusion coefficient. Last but not least, TeV halo might represent a novel and revolutionary way to detect new pulsars, allowing us to build larger pulsar catalogues and better understand these fascinating neutron stars.

Primary author: PINETTI, Elena (Fermilab)

Presenter: PINETTI, Elena (Fermilab)

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