

MAGIC detection of Geminga: an Inverse Compton tail?

G. Ceribella* (MPI), M. López-Moya (UCM), R. Mirzoyan (MPI) for the MAGIC Collaboration

This talk is about the recent discovery of pulsed very high energy gamma-ray (VHE) emission of the Geminga pulsar with the MAGIC Telescopes. With it, Geminga becomes the third known VHE pulsar, the oldest, and the only radio-quiet one to date. The detection has been made possible by the employment of a novel stereoscopic low-energy trigger, the Sum-Trigger-II. The enrichment of the elusive family of VHE pulsars is important to better understand the physics of these still mysterious sources.

The MAGIC Telescopes have observed Geminga for ~ 80 h, and detected pulsed gamma-ray emission between 15 GeV and 75 GeV, with a sound significance of 6.3 sigma. The VHE spectrum follows a simple steep power law relation, which smoothly joins the Fermi-LAT measurements at lower energies. We performed joint spectral fits of the MAGIC and Fermi-LAT data, and found that these disfavour an energy cutoff at the tens of GeV scale. This indicates that an inverse Compton component may be present in the VHE spectrum of Geminga. We investigated such possibility in the framework of the classic outer gap magnetospheric emission model, and concluded that the latter needs a revision to properly account for the observed spectrum of Geminga.

In the talk, we will review the technical improvements that made the detection possible, and discuss its significance for further VHE pulsar research. The results of this work have been published in the highlight letter “*Detection of the Geminga pulsar with MAGIC hints at a power-law tail emission beyond 15 GeV*” (A&A, 643, L14, 2020).