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Tera-electron-Volt pulsed emission from the Crab detected by MAGIC

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The last six years have witnessed major revisions of our knowledge about the Crab Pulsar, the central engine of the remnant of the supernova explosion that occurred in 1054 AD. The pulsed high-energy emission is believed to be due to synchrotron-curvature radiation in the pulsar magnetosphere, reaching a maximum energy of a few hundreds of GeV. However, new measurements obtained with the MAGIC telescopes have challenged the current plausible scenarios with the discovery of pulsed gamma-ray emission extending to the TeV regime. The pulse profile derived is consistent with those at lower energies, although a careful spectroscopic investigation of the peaks observed shows clear different spectral behaviour of those. This new spectral component requires gamma-ray production via inverse Compton radiation close to or beyond the light cylinder radius by an underlying particle population with Lorentz factors greater than 5×10^6 . We will present the new results and discuss the strong implications in the acceleration and radiation of particles in the surrounding of the Crab pulsar.

Collaboration

MAGIC

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Primary author: DE ONA WILHELMI, Emma (CSIC-IEEC)**Co-authors:** Mr GALINDO, Daniel (UB); Mr GARRIDO-TERRATS, Daniel (UAB); FIDALGO, David; Dr TORRES, Diego (IEEC-CSIC); GAUG, Markus (Universitat Autònoma de Barcelona); ZANIN, Roberta (Universitat de Barcelona); Dr SAITO, Takayuki (Kyoto University); Dr SCHWEIZER, Thomas (Max Planck Institute for Physics); BEDNAREK, Wlodek (University of Lodz); Mr IDEC, Wojciech (Max Planck Institute for Physics); LOPEZ, marcos (University Complutense of Madrid)**Presenter:** DE ONA WILHELMI, Emma (CSIC-IEEC)**Session Classification:** Parallel GA07 MAGIC**Track Classification:** GA-EX