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## The most precise measurements of the Crab nebula inverse Compton spectral component

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The Crab pulsar wind nebula (PWN) is one of the best studied astrophysical objects. Due to its brightness at all wavelengths, precise measurements are provided by different kind of instruments, allowing for many discoveries, later seen in other non-thermal sources, and a detailed examination of its physics. Most of the theoretical models for PWN emission are, in fact, based on Crab nebula measurements. The Crab nebula shows a broad-band spectrum spanning from radio frequencies up to VHE gamma rays and consists of two components, one of synchrotron origin and the other one due to radiative inverse Compton losses, starting at a few GeV. We will report the most precise measurements of the inverse Compton component from the Crab Nebula by combining data by the LAT detector on board of the Fermi satellite (1-300 GeV) and by the stereoscopic MAGIC system (>50 GeV). At low energies, the MAGIC results, combined with the Fermi/LAT data, show a flat and broad inverse Compton peak. The overall fit to the data between 1 GeV and 30 TeV is well-described by a modified log-parabola function with an exponent of 2.5, and places the position of the inverse Compton peak at around 53 GeV. The spectral measurements obtained by the MAGIC collaboration cover more than three decades in energy, allowing to address the still-open question about the maximum energy reached by the parent electron population. The broadness of the inverse Compton peak cannot be reproduced by either the constant B-field model or the MHD flow model. The conclusion, based on earlier data, that simple models (constant B-field, spherical symmetry) can account for the observed spectral shape has to be revisited at the light of the new MAGIC results. On the other hand, the time-dependent 1D spectral model provides a good fit of the new VHE results when considering a 80uG magnetic field. However, it fails to match the data when including the morphology of the nebula at lower wavelengths.

### Collaboration

MAGIC

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