

Cherenkov Telescope Array event reconstruction with ImPACT

Tuesday, 28 August 2018 15:45 (20 minutes)

In this presentation, the performance of a template-based event reconstruction algorithm will be shown for the first time for the Cherenkov Telescope Array (CTA), the next generation ground-based instrument for gamma-ray astronomy. In the Image Pixel-wise fit for Atmospheric Cherenkov Telescopes (ImPACT) the charge measured in each camera pixel of each telescope during an extended air shower (EAS) event is compared to an expected image template through a maximum likelihood fit. This allows us to reconstruct the direction and energy of the primary EAS particle and to accurately discriminate between gamma-ray signals and cosmic-ray background. This method already led to an improved H.E.S.S. sensitivity and angular resolution that was used successfully to study the extension of RX J1713.7-3946 and the Crab nebula.

For CTA, the study is based on air shower Monte-Carlo simulations and a detailed ray-tracing of the produced Cherenkov light within the individual telescopes of the CTA layout of the Southern Hemisphere. We will show that with ImPACT high angular resolutions and sensitivities can be reached over the full energy range of CTA between 20 GeV and 300 TeV. With the same data quality selection cuts applied, for most energies a significant enhancement in both properties is achievable compared to the standard analysis. This will reduce observation time needed for detection of TeV gamma-sources and improve the accuracy of morphological studies of complex sources.

Primary author: Mrs PÜRCKHAUER, Sabina (Max-Planck Institut für Kernphysik)

Co-authors: Prof. HINTON, J. (Max-Planck Institut für Kernphysik); Dr PARSONS, R.D. (Max-Planck Institut für Kernphysik)

Presenter: Mrs PÜRCKHAUER, Sabina (Max-Planck Institut für Kernphysik)

Session Classification: Poster Session and Coffee Break

Track Classification: Gamma-rays