



Contribution ID: 215

Type: **Presentation**

## **ImpACT: A Monte Carlo Template based analysis for Air-Cherenkov Arrays**

*Monday, June 23, 2014 6:10 PM (15 minutes)*

We present a high-performance event reconstruction algorithm: an Image Pixel-wise fit for Atmospheric Cherenkov Telescopes (ImpACT). This gamma-ray event reconstruction algorithm is based around the comparison of camera pixel amplitudes to an expected image template, performing a maximum likelihood fit to find the best-fit shower parameters. Related reconstruction algorithms have already been shown to provide significant improvements over traditional reconstruction techniques for both current and previous generation experiments. We demonstrate a significant improvement to the template generation step of the procedure, by the use of a full Monte Carlo air shower simulation in combination with a ray-tracing optics simulation to more accurately model the expected camera images. This reconstruction step is combined with an MVA-based background rejection.

Application of the ImpACT analysis to both simulated and measured (from a strong VHE source) gamma-ray data from the H.E.S.S. array demonstrates an improvement in sensitivity of more than a factor two in observation time over traditional image moments-fitting methods, with comparable performance to previous likelihood fitting analyses. ImpACT is a particularly promising approach for future large arrays such as the Cherenkov Telescope Array (CTA) due to its improved high-energy performance and suitability for arrays of mixed telescope types.

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**Session Classification:** Gamma-Ray Astrophysics

**Track Classification:** Gamma-Ray Astrophysics