



# FACT - Database-based Analysis and Spectrum Calculations

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## First G-APD Cherenkov Telescope

- Imaging Atmospheric Cherenkov Telescope (IACT) located at the Observatorio Roque de los Muchachos, La Palma, Spain
  - First IACT using SiPMs as photosensors
  - High data taking efficiency thanks to SiPMs and robotic operation
  - Main goal: Long-term monitoring of bright TeV blazars
  - Low-latency preliminary results available via onsite Quick Look Analysis (QLA)
- More details on the project in [1], [2] and [3]



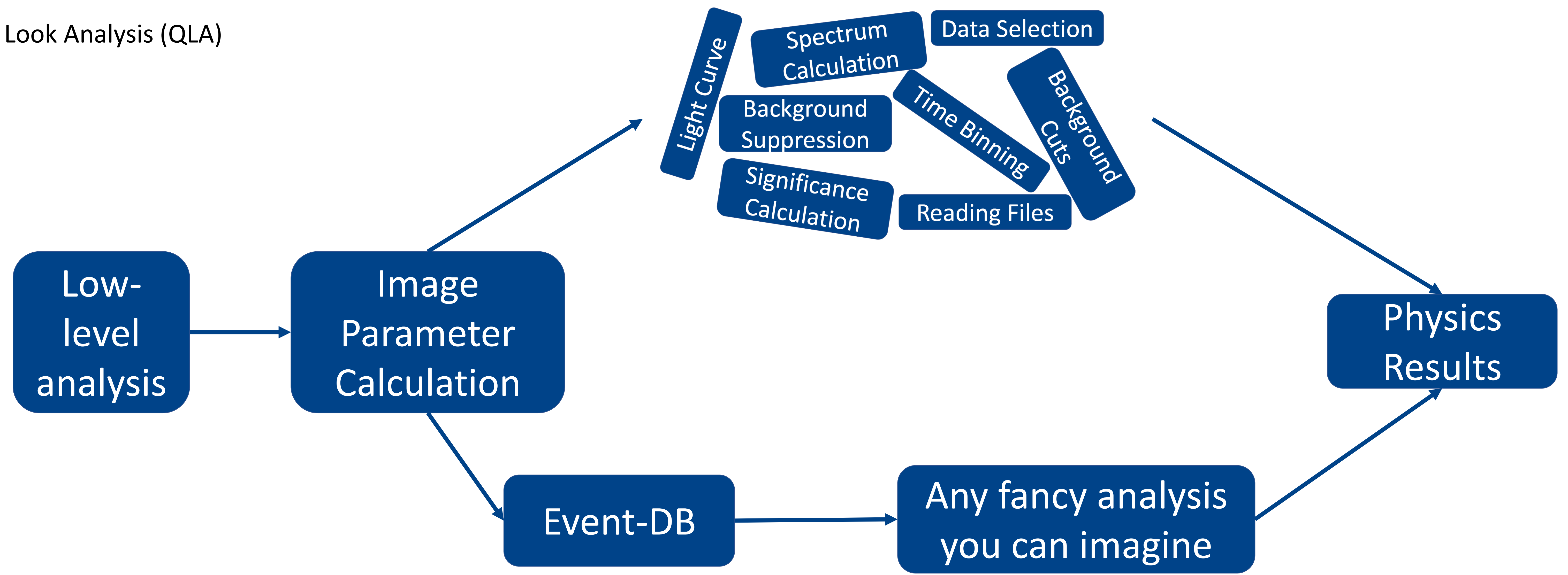
Photo: D. Dorner

## Data Analysis Chain:

- Signal extraction, calibrating the data and extrapolation of bad pixels
  - Image cleaning: Using signal and timing information to remove pixels only containing noise
  - Calculating various image parameters via statistical analysis
  - Background suppression: First use cuts to remove hadronic background events and in a second step use on/off source region to calculate the gamma-ray background
  - Create high-level output, like theta<sup>2</sup>-plots, light curves and spectra
- The analysis is done with the ROOT-based Modular Analysis and Reconstruction Software (MARS) [4]. A detailed description of the analysis steps can be found in [5]

## „Standard“ Analysis:

- Disadvantages for the user:
- User needs specific environment and software and has to use specific programming language
  - Computing power and disc space is needed
  - A lot of single steps for the analysis



## „Database-based“ Analysis:

- Advantages for the user:
- **Easy web-access** to the database
  - No personalized accounts needed on compute cluster
  - No specific environment or software is needed, just a basic mysql client
  - No need for computing power on user side
  - No need to create file lists and search paths
  - Only a minimum of disc space is needed
  - **Very flexible** queries possible, with user defined background suppression or time binning
  - **User choice** of programming language for further analysis
  - User just interacts with the database to get the results of the analysis
  - Easy possibility to create event lists in DL3 format

Perfect starting point for students  
Plug&Play solution for gamma-ray analysis

**References:**  
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 [3] D. Dorner et al. (FACT Collab), this conference  
 [4] T. Bretz and D. Dorner, Astroparticle, Particle and Space Physics, Detectors and Medical Physics Applications, 2010  
 [5] D. Dorner et al. (FACT Collab), Fermi Symposium proceedings, eConf C14102.1, 2014

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