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4. High energy cosmic rays (HE-CR I)

A template method for measuring the iron spectrum in cosmic rays with Cherenkov telescopes

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The energy-dependent abundance of elements in cosmic rays is an important part of the understanding of acceleration and propagation of cosmic rays. Most current results are obtained either from direct measurements by balloon/satellite borne detectors, or from indirect measurements by air shower detector arrays on the earth's surface. Imaging Air Cherenkov Telescopes, used mainly in gamma-ray astronomy, can also be used for cosmic ray physics. They can measure the direct Cherenkov light emitted by heavy nuclei as well as the Cherenkov light emitted by their air showers and are thus sensitive to the charge and energy of cosmic ray particles with energies of tens to hundreds of TeV.

I will introduce a template-based method that can be used to reconstruct charge and energy of primary particles simultaneously from images taken by IACTs. With this, we can separate heavy nuclei, eg. iron, from lighter cosmic rays, and thus measure the abundance and spectrum of these nuclei in the range of tens to hundreds of TeV.