

# The Use of an Optimal Distance from the Shower Core as Surrogate for Shower Size

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When analysing data from air-shower arrays, it has become common practice to use the signal at a considerable distance from the shower axis ( $r_{\text{opt}}$ ) as a surrogate for the size of the shower. This signal,  $S(r_{\text{opt}})$ , can then be related to the primary energy in a variety of ways. After a brief review of the reasons for the introduction of  $r_{\text{opt}}$ , made in a seminal paper by Hillas in 1969, it will be shown that  $r_{\text{opt}}$  is a more effective tool when the detectors are laid out on a triangular grid than when the detectors are deployed on a square grid. This result may have implications for explaining the differences of flux observed above 10 EeV by the Auger and Telescope Collaborations. Additionally, this finding should be kept in mind when designing new shower arrays.

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