

A search for ultra-high-energy photons at the Pierre Auger Observatory exploiting air-shower Universality



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What is this contribution about?

We developed a new analysis technique to search for ultra-high-energy photons applied to hybrid events with energies $E_0 \geq 1$ EeV collected at the Pierre Observatory.

Why is it relevant/interesting?

Photons with energies $E_0 \geq 10^{18}$ eV can reveal the nature and origin of cosmic rays of the highest energy.

What has been done?

We derived a new parameter, F_μ , related to the muonic content of an extensive air shower, from the **signal of an individual station** of the surface detector exploiting the **hybrid reconstruction** of the Pierre Auger Observatory, and the **air-shower Universality** property. Then F_μ and X_{\max} are combined in a Fisher discriminant analysis to improve the photon/hadron separation.

What is the result?

We selected 22 photon-like candidates (consistent with the estimated background). We derived the most stringent upper limits to the photon flux above 1 EeV.

