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Phenomenology of the invisible energy: revisiting the Heitler-Matthews cascade model.

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The estimation of invisible energy is central for experiments where only the electromagnetic component of the air shower is measured. This estimation is based on complex Monte Carlo simulations where the influence of the parameters describing the high energy hadronic interactions is difficult to unravel.
The Heitler-Matthews cascade model has been shown to be a powerful tool to
understand the phenomenology of particle cascades.
Despite its simplicity the model gives accurate predictions for many shower observables.
In this work, we use this model to study the invisible energy of the cascade and its
relationship with the primary particle mass and energy.
The expressions derived from the Heitler-Matthews model were used to describe the results from full Monte Carlo simulations, gaining insight on how the pion critical energy, pion multiplicity and inelasticity affects the amount of the invisible energy in the particle cascade.

Presentation type

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Primary author: Dr MARIAZZI, Analisa Gabriela (Instituto de Fisica La Plata - CONICET)

Presenter: Dr MARIAZZI, Analisa Gabriela (Instituto de Fisica La Plata - CONICET)

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