

Phenomenology 2022 Symposium: From Virtual to Real



Contribution ID: 69

Type: not specified

Learning the composition of Ultra-High Energy Cosmic Rays

Tuesday 10 May 2022 15:00 (15 minutes)

We use statistical inference to derive the mass composition of Pierre Auger Open Data at different energies. We simulate showers for all elements between proton and iron and use them to train a set of classifiers, each one trained to distinguish set of primaries by their χ^2 distributions. By unfolding this data, we can obtain the most probable mass composition distribution for each energy bin. Moreover, we use timing information to correlate data from ground detectors to χ^2 , which allows us to extract the mass composition from non-hybrid showers. We show the results using four different high energy hadronic model inputs for our simulations.

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Session Classification: BSM III