

Model-stable universality of the air shower electromagnetic component: an approach to solving the mass composition problem

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New results on the universal relation between radial scale factor and longitudinal age of the extensive air shower electron component are reported. We confirm that the scale factor of electron lateral distribution is potentially effective primary mass estimator, being evaluated from the surface detectors data with high duty cycle. When combining with the fluorescence detectors data on longitudinal shower age, it provides improved composition results both for average shower measurements and on event-by-event basis. Using CORSIKA simulations, we examine the sensitivity of conclusions to the hadronic interactions model. The enhancements of such a theoretically motivated tool for the unbiased cosmic ray composition deduction in a wide primary energy range from multi-hybrid EAS data of nearest future are discussed.