

Results on mass composition of cosmic rays as measured with LOFAR

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We present an updated analysis of the mass composition of cosmic rays in the 10^{17} to 10^{18} eV energy range. It is based on measurements with the LOFAR telescope of the depth of shower maximum, X_{\max} . We review the improvements to the simulation-based reconstruction setup, as well as the selection method to obtain a minimally biased X_{\max} -dataset. Systematic uncertainties on X_{\max} have been lowered to an estimated 7 to 9 g/cm², at a resolution of about 20 g/cm² per shower. Results include estimates of the mean and standard deviation of the X_{\max} -distribution. A statistical analysis at distribution level has been done as well, using a 4-component model of light to heavy nuclei. It confirms our previous results showing a significant low-mass fraction in this energy range. We discuss consistency with existing results on X_{\max} and mass composition.

Keywords

air showers; cosmic rays; mass composition; shower maximum; X_{\max}

Collaboration

LOFAR

other Collaboration

Subcategory

Experimental Results

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