SEARCH FOR FINE STRUCTURE OF THE KNEE IN EAS SIZE SPECTRA

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28 size spectra of EAS in the knee region from 7 different experiments are analysed in a consistent way. They are fitted independently by adjusting either 4 or 5 parameters: knee position, exponents above and below the knee, overall intensity and, in addition, a parameter describing the smoothness of the bend. The residual spectra are then shifted to the same knee position and averaged. The data clearly require a finite smoothness of the knee for a satisfactory description. When 5 parameters are employed the averaged residuals are well compatible with 0 from about a factor of 20 below to a factor of 4 above the knee, at the 1 % level. At larger shower sizes the deviations increase up to -5 and +10 %. Their size dependence can hardly be called statistical and is compatible with a second knee at about a factor of 50 above the main knee. Such a fine structure may of course be expected if the position of the knee depends on mass or charge of the primary particles. It cannot at present be ruled out, though, that detector saturation effects could mimic a similar irregularity.