

Chemical composition of primary cosmic rays with energies around the knee region observed at Mt. Chacaltaya

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Abstract. The chemical composition of primary cosmic rays around the knee region has been investigated with an air shower array at Mt. Chacaltaya. From 1987 to 1991, we examined observed equi-intensity curves comparing those with a Monte Carlo simulation where the primary composition is assumed to be a mixture of protons and Fe nuclei, and obtained their mixing ratio as a function of the primary energy (Ogio et al., 2001). Moreover, from 1995 to 1997, we made a measurement of arrival time distributions of air Čerenkov light. From an analysis of arrival time distributions of Čerenkov light, we obtained the composition as a mixture of proton, He, CNO, Si-Mg, Fe groups (Shirasaki et al., 2001). Both the results show that the average mass number of primary nuclei $\langle \ln A \rangle$ gradually increases up to ~ 2 around the knee region and up to ~ 3 around 10^{16} eV. In 1999, we improved our ar-

ray to observe air showers with lower primary energies. Furthermore, we installed five detectors in the array to measure the lateral distribution of air Čerenkov light. Now we examine the chemical composition of primary cosmic rays above 5×10^{12} eV more precisely with air Čerenkov light data and an equi-intensity curve analysis.

References

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