



A Monte Carlo study to measure the energy spectra of the primary heavy components at the knee using a new Tibet AS core detector array and a large underground muon detector array

J. HUANG¹, M. SHIBATA², D. CHEN², N. HOTTA³, Y. KATAYOSE², M. OHNISHI¹, T. SAITO⁴, M. TAKITA¹ AND T. YUDA⁵

¹*Institute for Cosmic Ray Research, University of Tokyo, Kashiwa 277-8582, Japan.*

²*Faculty of Engineering, Yokohama National University, Yokohama 240-8501, Japan.*

³*Faculty of Education, Utsunomiya University, Utsunomiya 321-8505, Japan.*

⁴*Tokyo Metropolitan College of Industrial Technology, Tokyo 116-8523, Japan.*

⁵*Faculty of Engineering, Kanagawa University, Yokohama 221-8686, Japan.*

huang@icrr.u-tokyo.ac.jp

Abstract: The first phase experiment of the Tibet hybrid experiment to measure the energy spectrum of the light components (proton and helium) strongly suggested that the knee region should be dominated by heavy components. A new type of air shower core detector Tibet-YAC (Yangbajing Air shower Core detector) as well as Tibet-MD (a large underground muon detector array) are being planned. In this paper, the capability of the event-by-event measurement of the chemical components with use of the Tibet III+YAC+MD is investigated by means of an extensive Monte Carlo simulation in which the secondary particles are also propagated through the YAC + MD array. Our simulation shows that the new installation is powerful enough to study the chemical composition, and in particular, to obtain the energy spectrum of the major component at the knee.