Search for sporadic enhancements of UHECR and correlations with cosmic phenomena in LAAS experiment

Nobuaki Ochi,[1] Atsushi Iyono,[2] Takeharu Konishi,[3] Toru Nakamura,[4] Takao Nakatsuka,[5] Soji Ohara,[6] Nobuharu Ohmori,[4] Kazuhide Okei,[7] Katsuhiko Saitoh,[8] Junpei Tada,[7] Nobusuke Takahashi,[9] Shuhei Tsuji,[10] Tomonori Wada,[7] Isao Yamamoto,[11] Yoshihiko Yamashita,[7] and the Large Area Air Shower (LAAS) group

(1) Simulation Science Center, Okayama Univ. of Science, Okayama 700-0005, Japan
(2) Dept. of Computer Simulation, Okayama Univ. of Science, Okayama, Japan
(3) Dept. of Physics, Kinki Univ., Higashi-Osaka 577-8502, Japan
(4) Fac. of Science, Kochi Univ., Kochi 780-8520, Japan
(5) Okayama Shoka Univ., Okayama 700-8601, Japan
(6) Fac. of Economy, Nara Univ. of Industry, Ikomagun 636-0821, Japan
(7) Dept. of Physics, Okayama Univ., Okayama 700-8530, Japan
(8) Ashikaga Institute of Technology, Ashikaga 326-8558, Japan
(9) Dept. of Electronic and Information System Engineering, Hirosaki Univ., Hirosaki 036-8561, Japan
(10) Dept. of Information Sciences, Kawasaki Medical School, Kurashiki 701-0192, Japan
(11) Dept. of Information and Computer Engineering, Okayama Univ. of Science, Okayama 700-0005, Japan

Abstract

The Large Area Air Shower (LAAS) group has been collecting extensive air shower (EAS) data by compact EAS arrays simultaneously operating at eleven sites in Japan. Working since 1996, a large number of EAS data have been accumulated and they are analyzed in this report. In order to find out signals from short-lived burst activities in the universe, we inspect EAS trigger rates of short time windows and search for sporadic excess events in them. Significant events are furthermore employed to explore possible correlations with cosmic phenomena such as gamma-ray bursts, cluster events observed by AGASA and highest energy cosmic rays by AGASA and HiRes. Particularly, our EAS arrays in Okayama area, of which trigger conditions are uniformly set at 2-fold coincidence of adjacent counters since 2002, are expected to be more sensitive to such sporadic phenomena because they can be triggered by lower energy primary particles. The results using all LAAS data will be presented at the conference.

pp. 215–215