



Contribution ID: 1009

Type: **Poster contribution**

Latest emulsion detector for cosmic ray observation: high sensitive emulsion film and high speed readout system

Saturday, August 1, 2015 3:30 PM (1 hour)

Nuclear emulsion is a high resolution 3D tracking device. $0.2 \mu\text{m}$ AgBr crystals penetrated by a charged particle grow into $0.8 \mu\text{m}$ silver grains which can be observed as a track by a microscope via chemical development process. The recent fully automated readout systems enabled not only high resolution measurements but also large-scale experiments (accelerator experiments, balloon-borne experiments, cosmic ray muon radiography, and so on).

Since 2010, circumstances of the emulsion detector has drastically changed. We have introduced a system of nuclear emulsion gel production to the laboratory in Nagoya University, Japan, and have started self-development and supply of the new, ambitious gel, instead of the photographic film companies. We have also developed a next-generation readout system, Hyper Track Selector (HTS). The scanning speed is designed to $0.9 \text{ m}^2/\text{h}$ (100 times faster than that of the current system).

Gamma-Ray Astro-Imager with Nuclear Emulsion (GRAINE) is a project of cosmic gamma-ray observation using the balloon-borne emulsion detector. The angular resolution of the emulsion gamma-ray telescope (0.08° @ 1-2 GeV) is one order of magnitude better than that of the Fermi-LAT. In addition, It has the polarization sensitivity using the pair creation mode. Search for exotic particles and measurement of short-lived particle production rate in cosmic rays at balloon altitudes will be also conducted. In the GRAINE 2nd balloon-borne experiment in 2015 May, 50 m^2 of the new high sensitive emulsion films are used for the middle-scale gamma-ray telescope (aperture area 3600 cm^2) which we demonstrate the imaging performance by.

We present the status of the latest emulsion detector and readout system based on results of performance tests conducted for the GRAINE balloon-borne experiment in 2015.

Collaboration

– not specified –

Registration number following "ICRC2015-I/"

846

Primary author: ROKUJO, Hiroki (Nagoya University)

Co-author: COLLABORATION, GRAINE (GRAINE collaboration)

Presenter: ROKUJO, Hiroki (Nagoya University)

Session Classification: Poster 2 CR

Track Classification: CR-IN