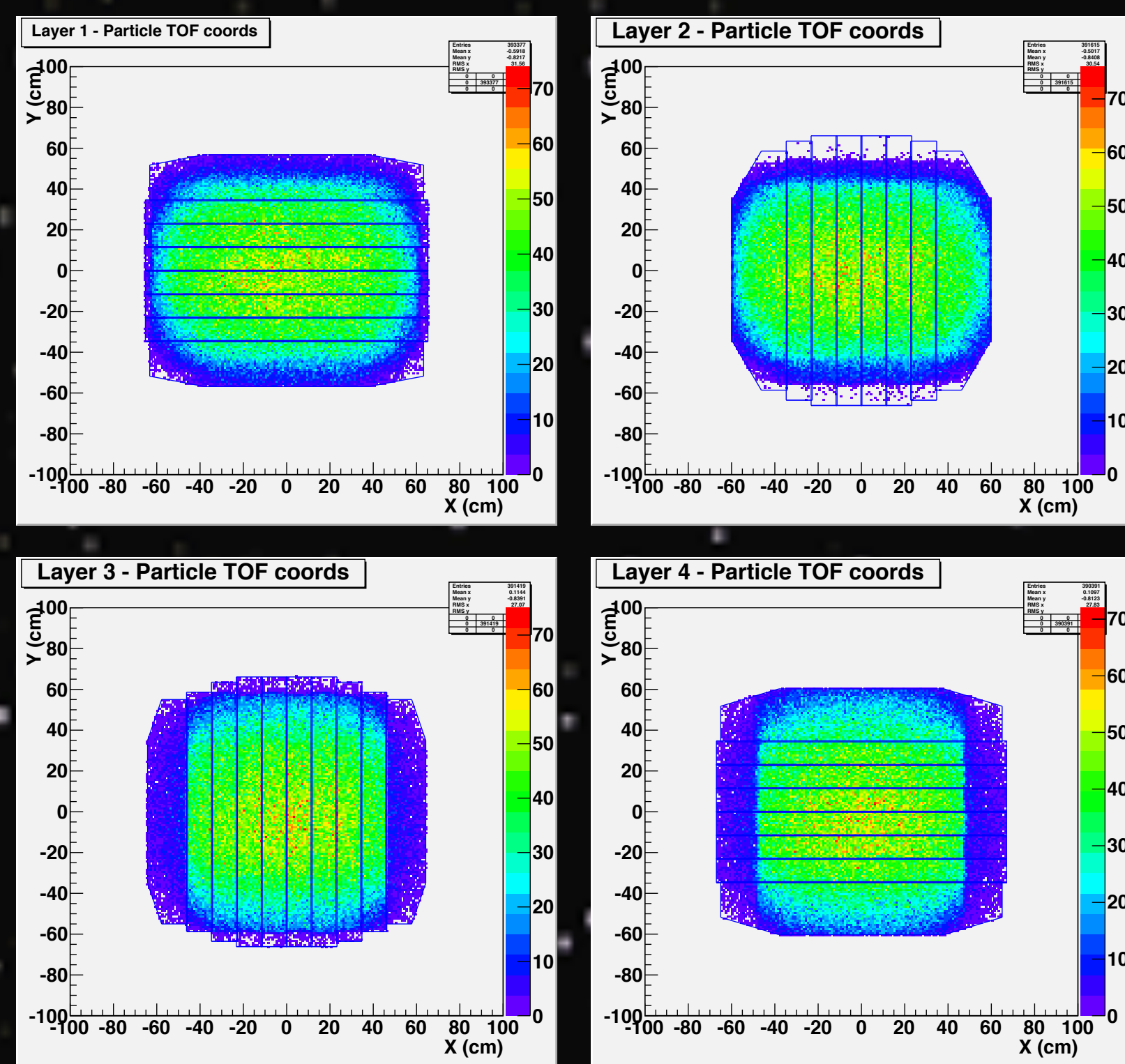
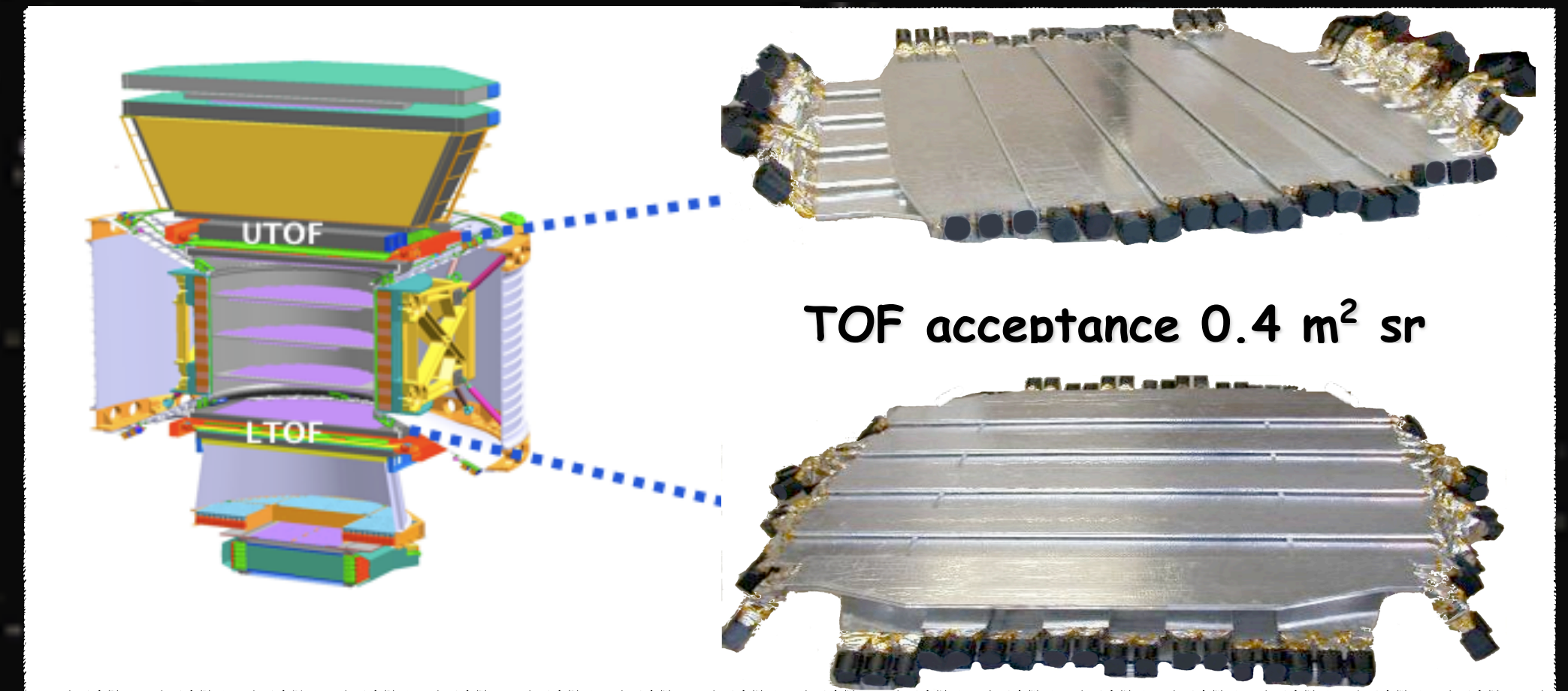


The Alpha Magnetic Spectrometer AMS-02 has been installed in May 19th 2011 on the International Space Station where it will perform accurate measurements of the cosmic rays up to the TeV scale, providing the most sensitive search for the existence of primordial anti matter and indirect search for dark matter.

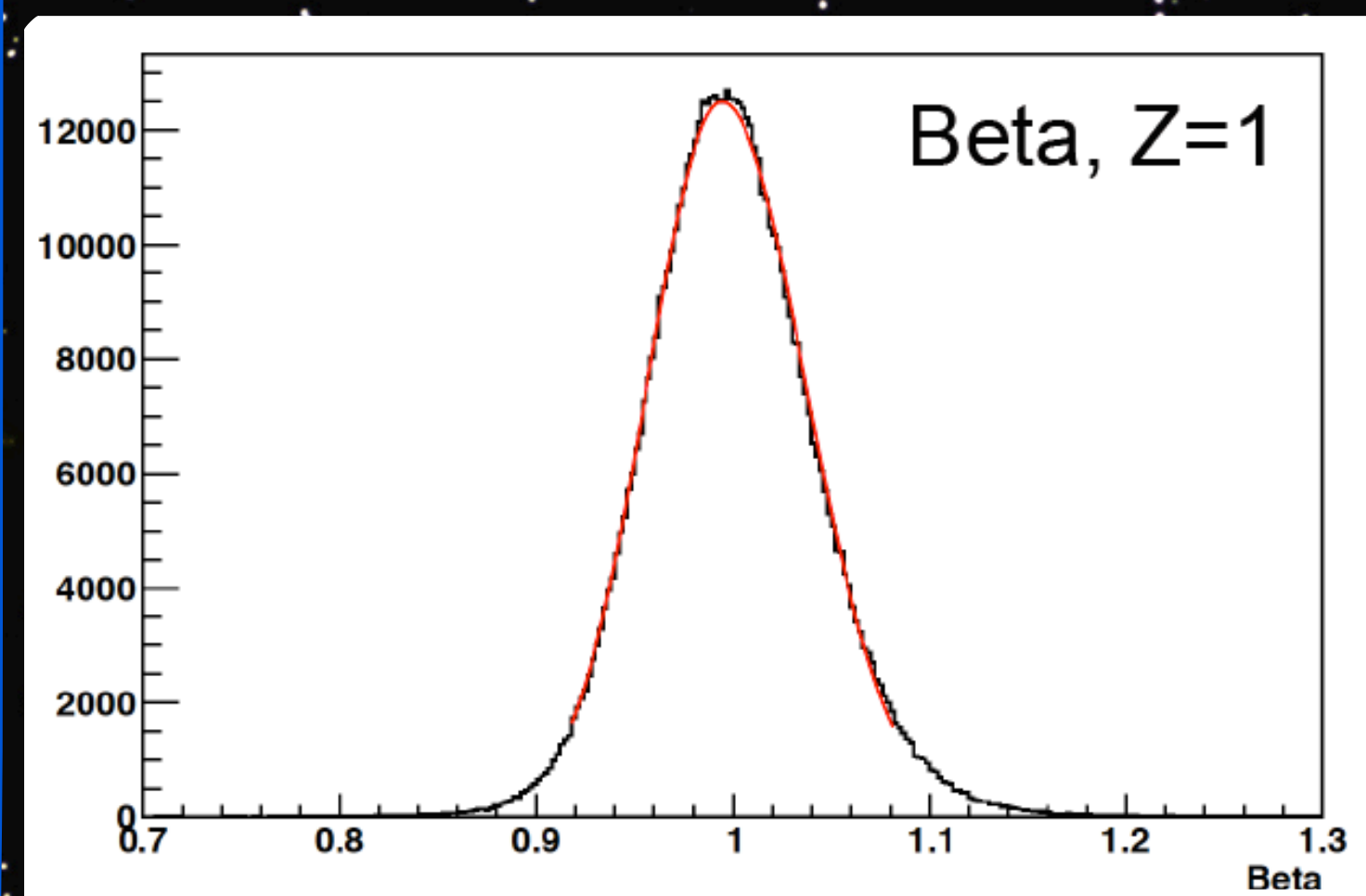
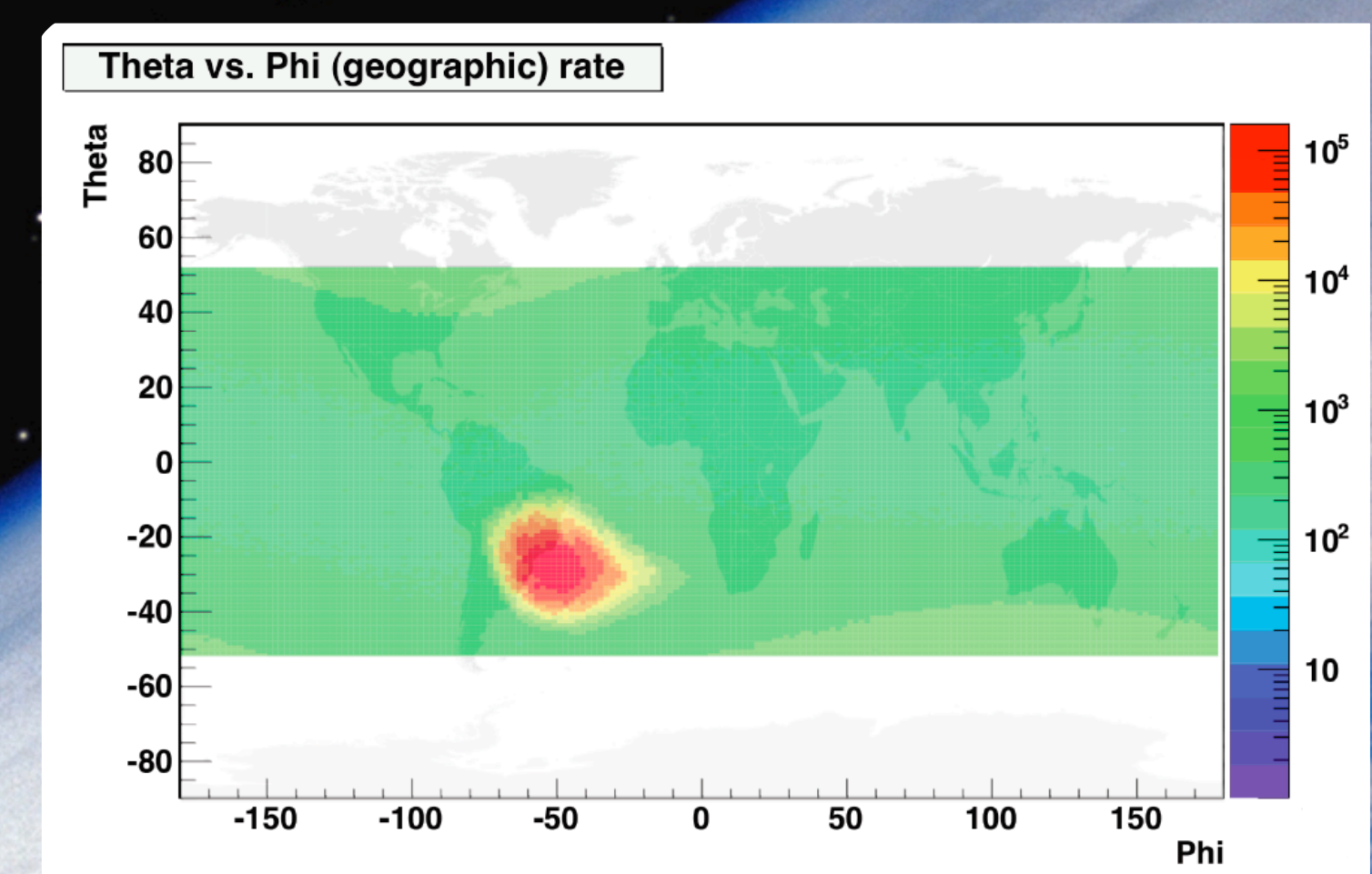
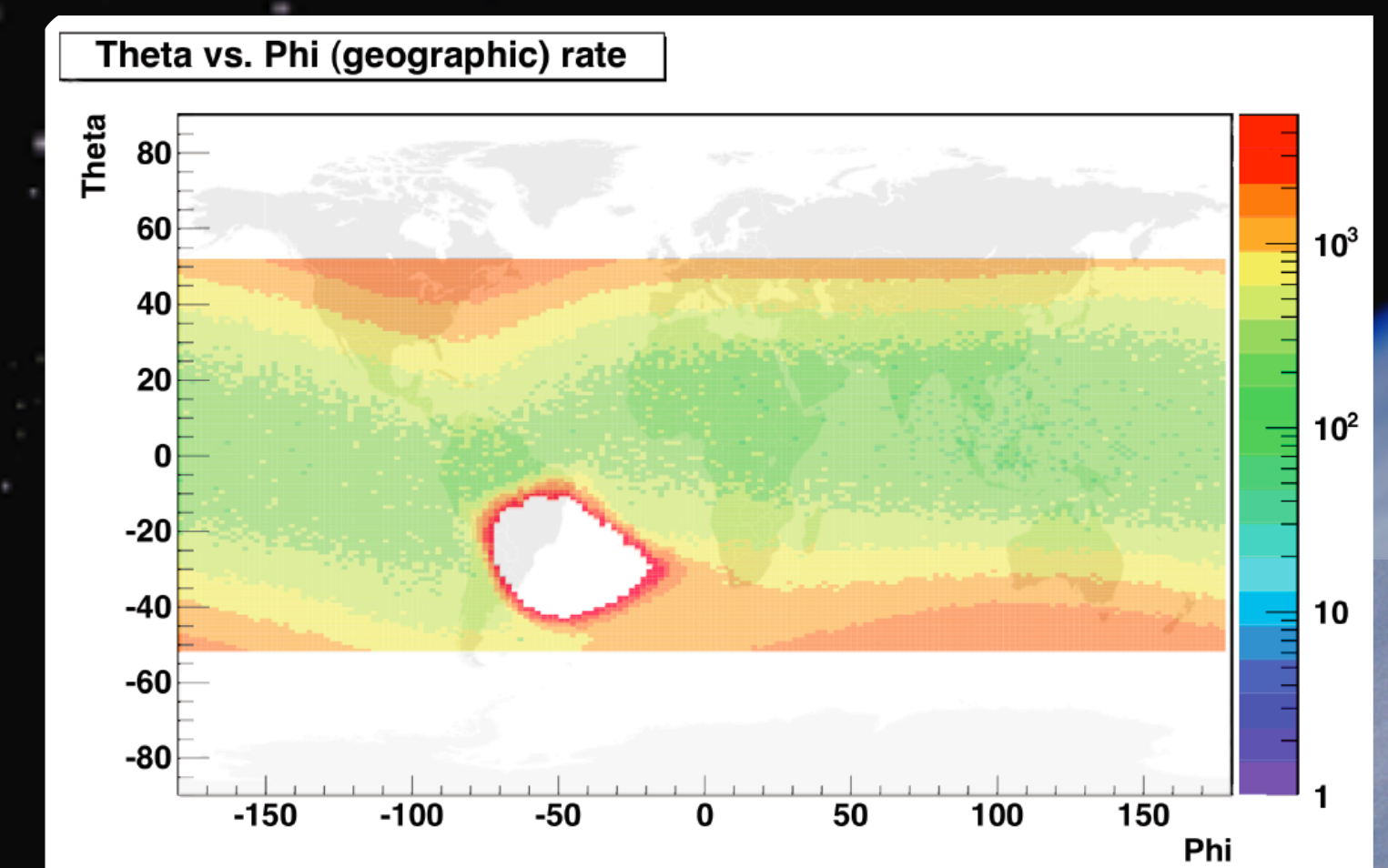
The Time Of Flight (TOF) is composed by four planes of plastic scintillators.

The TOF detector main objectives are to provide: the trigger to AMS-02 and the measurement of the velocity and of the charge of the crossing particles.



During this first year of operation in Space, 15 billions physical events were acquired. TOF kept the nominal settings in terms of high voltages and thresholds. All TOF channels are working as expected. The track hit points in X and Y coordinates on each of the four TOF planes are shown. The distributions agree with AMS acceptance.

AMS-02 operates at trigger rates up to 2 kHz with an average event size of about 2 KBytes. The absolute rates of one paddle in the first plane in different geographical location along the orbit of the ISS is shown on the figures. Higher rates correspond to regions with lower values of the geomagnetic cutoff as in the polar regions (top figure), and in the South Atlantic Anomaly (bottom figure).



Cosmic rays velocity (Beta) is measured by TOF using the time between the upper and lower planes and the trajectory length. The resolution in velocity measurement is 4% for protons and decrease for high Z nuclei. From the relation:
 $p/c = m \beta \gamma$
it is possible to identify the particle mass.

In TOF both the sum of the anode signal from each counter side and the last third dynode from each TOF photomultiplier are acquired and used in the measurement of the charge. The anode signals distinguish the charged particles with low Z, and when anode signal starts to saturate, the dynode signals are used to enlarge the dynamical range for the charge measurement. TOF is able to measure the charge released by the particle in the scintillator up to at least charge Z=14.

