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Observations of primary, trapped and quasi trapped particles with PAMELA experiment

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Abstract content

PAMELA was launched on June 15th 2006 in a pressurized container on board the Russian Resurs-DK1 satellite. The satellite is flying in high inclination (70°), low Earth Orbit (350-600 km), performing measurements in different points and conditions of the geomagnetosphere. The device is a multi-purpose apparatus composed of a permanent magnet spectrometer to provide particle charge, rigidity and incoming angle. A series of six scintillator counters arranged at its extremities provide redundant Time-of-Flight and charge data. Lepton/hadron identification is performed by a Silicon-Tungsten calorimeter and a Neutron detector placed at the bottom of the device. An Anticounter system is used offline to reject false triggers coming from the satellite. PAMELA is capable of detecting protons (80 MeV- 700 GeV), antiprotons (80 MeV-190 GeV), electrons (50 MeV - 400 GeV), positrons (50 MeV - 270 GeV) and nuclei ($\sim 100 \text{ MeV/n}$ - 200 GeV/nuc). In addition a technique employing scintillator counting rate and range energy methods allows to lower the minimum detectable energy range of the apparatus to 36 MeV and 3.5 MeV for protons and electrons respectively. The orbit of the satellite and the characteristics of the magnet tracker allows PAMELA to perform a very detailed measurement of the nature and spectra of primary (above cutoff) and secondary particles (sub-cutoff: trapped, reentrant albedo, etc.). The precise measurements of particle distribution in different regions of the orbit provides information on the processes of production, propagation and interaction of particles in Earth's magnetosphere. In this work we will also discuss different methods of calculation of geomagnetic coordinates and particle cutoff comparing them with expected and measured fluxes.

If this paper is presented for a collaboration, please specify the collaboration

PAMELA Collaboration

Summary

Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Olivo, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 1 (SH), pages 709-712

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