

WIZARD/PAMELA

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After ten years (2006-2016) running and data taking, the space mission PAMELA, on board the Russian Satellite Resurs-DK1, was terminated due to the end of the satellite lifetime (nominally planned to operate for three and half years). The mission and the instrument, the main scientific goals and the results of the experiment have been described in detail in the previous reports. The “10 Years of PAMELA” were celebrated on June 15, 2016 in a dedicated international workshop at Villa Mondragone, Frascati-Monteporzio, gathering cosmic ray scientist from several countries.

The LNF WIZARD/PAMELA group has continued in 2017 its regular activity in the data analysis. In particular, it is fully involved in the study and analysis of solar events (Solar Flares, Solar Energetic Particles (SEP), Forbush decrease) in collaboration with Universities and Institutions (including NASA) in USA, Germany and South Africa. This work, in particular, has been the object of a PhD thesis on the study of low energy protons in the cosmic radiation and the role of the Sun and the Heliosphere in their production and propagation in the Galaxy. A new work, based on the analysis of proton data in correlation to possible production in the Jovian magnetosphere, has been completed and published in early 2018 (see References below).

As it is well known, significant results have been obtained and published on the spectrum of positrons, electrons antiprotons, protons and He nuclei. An implementation and update of these results has been carried out with the refinement of data reduction algorithms and the extension of the statistics.

The collection of all the results so far obtained by PAMELA has been published in 2014 in a monographic issue of Physics Report Journal (see publications below), followed by an updated report published in the Rivista del Nuovo Cimento.

Presentations on the most recent results of the experiment have been given in several Conferences.

It is worth to note that, since 2013, under the agreement between INFN, ASI and Telespazio, a dedicated database for PAMELA has been created and developed and is in operation in the ASI Science Data Center (<http://www.asdc.asi.it>) as a data archive with open access through web interface to the scientific community.

Since several years PAMELA is a Recognized Experiment at CERN under the code PAMELA RE2B (<https://greybook.cern.ch/greybook/experiment/detail?id=RE2B>).

Publications-References

1. “The PAMELA Mission: Heralding a new era in precision cosmic ray physics”; O. Adriani et al., Physics Reports, **544**, 323-370 (2014)
2. “Ten Years of PAMELA in Space”; O. Adriani et al., Riv. Nuovo Cim. vol 40, Issue 10, 473-522 (2017)
3. “Unexpected cyclic behavior in cosmic ray protons observed by PAMELA at 1 AU”, O. Adriani et al., ApJ Lett. **852**, L28 (2018)
4. PAMELA web home page: <http://pamela.roma2.infn.it/>