POSTER: Consolidation of the absolute level of the Galactic Cosmic Ray (GCR) protons spectrum and its uncertainty at L2 during the ATHENA mission lifetime (2031 - 2035).

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ATHENA (Advance Telescope for High Energy Astrophysics), the selected second large-class mission in the ESA Cosmic Vision 2015-2025, will be launched in 2031 toward a L2 orbit. The aim of the mission is observing the universe in high energy with an unprecedent high resolution. One of the two instruments, the X-IFU (X-ray Interal Field Unit), is a high resolution cryogenic spectrometer. To allow its performances, the instrument will be equipped with a Cryogenic Anticoincidence (CryoAC), which requirements will be defined by the study of the Cosmic Ray (CR) background expected during the mission lifetime. The lack of satellite data over more solar cycles and the discrepancies of forecast tools with respect the flux intensities measured, represents the highest difficulty of this study.

This work aims to define a new cosmic ray reference of the highest spectrum that could be registered during the ATHENA lifetime and to study its possible variability. In order to obtain this spectrum, we have studied the Neutron Monitor (NM) countrate registered on the Earth surface by the Oulu Cosmic Ray station. This study lead us to define the 2009 as the year with the highest CR flux ever measured since the 1964 and with the same sun magnetic field polarity expected during the ATHENA years of operability. We have so taken into account the CR measurements of three different satellite (SOHO, Pamela and Voyager2) during the 2009, with an additional work to rescale the measurements of Voyager2 at 1 AU distance from the Sun. The merging of these three set of data, lead us to a new reference CR spectrum.

Moreover, we have found a correlation between the NM countrates and the SOHO CR measurements: this correlation allow us to use the NM countrate from the early '60es as proxy for the CR fluxes of the past decades. This information lead us to an estimation of the possible CR variability during the entire ATHENA lifetime.