



## **Multichannel Investigation of Solar Modulation Effects in Galactic Cosmic Rays**

Acronimo: **MAtISSE**

**Horizon 2020 – Pilastro Excellent Science**

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**Abstract:** The MAtISSE project, an individual Marie Curie fellowship awarded to the Department of Physics & Earth Science, concerns the Multichannel Investigation of Solar Modulation Effects in Galactic Cosmic Rays. When entering the heliosphere, cosmic rays encounter a turbulent flowing plasma, the solar wind, which modulates their energy spectra. The solar modulation is expected to be different for positive and negative particles or for leptons and nuclei. The study of these effects has been limited for long time by two factors: the scarcity of long-term cosmic rays data, and the poor knowledge of the interstellar spectra. With the Alpha Magnetic Spectrometer (AMS), whose design and construction have enjoyed the leading and substantial contribution from the astro-particle group of the University of Perugia (Dept of Physics & Earth Science), in continuous operation on the International Space Station, we have now an excellent multichannel cosmic ray monitor of solar activity. With the spectacular Voyager-1's entry in the interstellar space, we have the very first data of fluxes unaffected by solar modulation. With the unprecedented quality of new data, the MAtISSE project is aimed to achieve strong theoretical and observational milestones. By advancing observations of particles and antiparticles, we will explore the origin of cosmic rays and their propagation in the Galaxy. The goal of this project addresses a prerequisite for modelling the effects of cosmic radiation and space weather hazards, which is an increasing concern for space missions and air travellers. The hosting group at the Dept. is strongly and successfully involved in international research projects and has the right competence and experience to fully support MAtISSE.