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Expected breakthroughs in the field of "Sun and Solar System"

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At INAF the research in the field of "Sun and Solar System" is included in the scientific national grouping 3 (Raggruppamento Scientifico Nazionale 3, RSN3). As in other fields of science, the research activities are divided into three main areas: observations, models/theory, and laboratory.

Like the other groupings, observations in the area of RSN3 are carried out with ground-based and space-borne telescopes (remote sensing). However, our grouping is in addition characterised by the extensive use of space probes that provide close-up imaging or even sampling of the objects of interest. Models and theory are reaching increasingly high levels of sophistication and realism by taking advantage of modern and state of the art knowledge on machine learning and artificial intelligence (e.g. for space weather applications). Laboratory activity is devoted (i) to design and test scientific instruments, (ii) to analyse extraterrestrial samples and relevant analogues, and (iii) to study the effects of energetic processing on solid samples to simulate the effects of space weathering (solar wind, solar energetic particles, galactic cosmic rays, electromagnetic radiation, meteorite and micrometeorite impacts) on the surface of solar system objects without a thick atmosphere and/or without a magnetic field.

In this talk, I will review some of the main activities the RSN3 community is involved in and will outline the expected breakthroughs.

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Sole e Sistema solare

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