R010-04
B 会場 ：11/27　AM1 （9:00-10:15）
9:45〜10:05

SOLAR-C による宇宙天気研究への貢献

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Contribution to space weather research by SOLAR-C

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As a fundamental step towards answering how the plasma universe is created and evolves, and how the Sun influences the Earth and other planets in our solar system, the proposed mission is designed to comprehensively understand how mass and energy are transferred throughout the solar atmosphere. Understanding the solar atmosphere, which connects to the heliosphere via radiation, the solar wind and coronal mass ejections, and energetic particles, is pivotal for establishing the conditions for life and habitability in the solar system. SOLAR-C is a mission designed to provide a conclusive answer to the most fundamental question in solar physics: how does the interplay of magnetic fields and plasma drive solar activity? The most significant examples of this interplay are atmospheric heating and explosive energy release, such as flares and coronal mass ejections (CMEs). Thus, the two primary science objectives for SOLAR-C are:

I. Understand how fundamental processes lead to the formation of the solar atmosphere and the solar wind.

II. Understand how the solar atmosphere becomes unstable, releasing the energy that drives solar flares and eruptions.

In order to advance our understanding of the mysterious Sun, especially of the origin of the hot solar atmosphere and the occurrence of the solar flares, the SOLAR-C mission concept tackles the scientific objectives by taking the following unique approaches:

A. To seamlessly observe all the temperature regimes of the atmosphere from the chromosphere to the corona simultaneously,

B. To resolve elemental structures of the solar atmosphere and track their changes with sufficient cadence, and,

C. To obtain spectroscopic information on dynamics of elementary processes taking place in the solar atmosphere.

Towards answering how and when the Sun causes disturbances to the Earth and other planets, quantification of physical conditions in and around the flare-productive active region obtained from SOLAR-C observations will advance our understanding of the physical processes of the solar flares and eruptions. The knowledge will be utilized to develop new algorithms of flare predictions and estimate impacts on the terrestrial environments with the help of other observations and theoretical modeling. It is expected that in the forth-coming decades, humanity will expand its territory to the Moon and Mars. The knowledge obtained by SOLAR-C will be utilized to predict space environments of the Earth, Moon, Mars, and beyond, supporting the sustainable space exploration.