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The next-generation space solar observatory SOLAR-C

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The SOLAR-C is a planned satellite mission that is led by the JAXA SOLAR-C working group as the 4th Japanese space solar observatory that follows the 3rd satellite mission, Hinode. Hinode equips three major science payloads to cover from the photosphere to the corona simultaneously and has revealed the ubiquitous emergence/submergence of small-scale bipolar fields and the formation of kilo Gauss magnetic flux tubes from vector magnetic field measurements on the photosphere, unexpected dynamical phenomena in the chromosphere, spectral signatures of small-scale coronal heating events near the chromosphere below its spatial resolution, and so forth. These are the universal magnetized plasma activity in the nearest star, and the essential energy source of the phenomena is of magnetic-field origin coupled with photospheric convective motion. To elucidate the newly-found solar active phenomena and the problems that have been tackled for a long time in solar physics, we try to understand the causal linkage between solar magnetic fields and active phenomena on the Sun in the true sense by high-resolution (0.1-0.3 arcsecs) instruments in space. SOLAR-C will observe photospheric and chromospheric activity by imaging and measure chromospheric magnetic fields by spectro-polarimetry, in addition to photospheric magnetic fields. It visualizes the site of dynamical events for chromospheric and coronal heating by imaging and spectroscopy with comparable resolution and by high-resolution chromospheric magnetometry. In addition, SOLAR-C essentially contributes to space weather by estimating the stored magnetic energy in the corona via measurements of chromospheric magnetic fields.