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We detect a new population of chromospheric jets in a polar coronal hole observed by Hinode/SOT. The propagating speed of the jets ranges in 30 – 490 km/s whose duration time is 3 – 52 s. The recurrent rate is approximately 3/min for a give segment of 1 arc-second horizontal interval. These jets are seemed to be more transient and faster than type II spicules at chromosphere, while the properties are compatible with the network jets seen in emission lines of transition region. We will discuss the implication of these jets for a coronal heating.

[구 SS-06] Development of a diagnostic coronagraph on the ISS: progress report

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The Korea Astronomy and Space Science Institute (KASI) has been developing a coronagraph in collaboration with the National Aeronautics and Space Administration (NASA), to install it on the International Space Station (ISS). The coronagraph will utilize spectral information to simultaneously measure electron density, temperature, and velocity. For this, we develop the coronagraph as a two-step process. First, we will perform a stratospheric balloon-borne experiment, so called BITSE, in 2019 with a new type of coronagraph. Second, the coronagraph will be installed and operate on the ISS (CODEX) in 2021 to address a number of questions (e.g., source and acceleration of solar wind, and coronal heating) that are both fundamental and practically important in the physics of the solar corona and of the heliosphere. In this presentation, we will introduce recent progresses.

[구 SS-07] Application of Deep Learning to Solar Data: 1. Overview

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Multi-wavelength observations become very popular in astronomy. Even though there are some correlations among different sensor images, it is not easy to translate from one to the other one. In this study, we apply a deep learning method for image-to-image translation, based on conditional generative adversarial networks (cGANs), to solar images. To examine the validity of the method for scientific data, we consider several different types of pairs: (1) Generation of SDO/EUV images from SDO/HMI magnetograms, (2) Generation of backside magnetograms from STEREO/EUVI images, (3) Generation of EUV & X-ray images from Carrington sunspot drawing, and (4) Generation of solar magnetograms from Ca II images. It is very impressive that AI-generated ones are quite consistent with actual ones. In addition, we apply the convolution neural network to the forecast of solar flares and find that our method is better than the conventional method. Our study also shows that the forecast of solar proton flux profiles using Long and Short Term Memory method is better than the autoregressive method. We will discuss several applications of these methodologies for scientific research.

This work was supported by Institute for Information & communications Technology Promotion(IITP) grant funded by the Korea government(MSIP) (2018-0-01422, Study on analysis and prediction technique of solar flares).

[구 SS-08] Solar farside magnetograms from deep learning analysis of STEREO/EUVI data

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Solar magnetograms are important for studying solar activity and predicting space weather disturbances1. Farside magnetograms can be constructed from local helioseismology without any farside data2-4, but their quality is lower than that