the H_2 emission lines for six SNRs are well consistent (±5 km s^{-1}) with those obtained in previous radio observations, while for the other five SNRs (G18.1-0.1, G18.9-1.1, Kes 69, 3C 396, W49B), they are significantly different. We discuss the velocity discrepancies in these five SNRs. In G9.9-0.8, the H_2 emission shows non-thermal line ratios and very narrow line width (~4 km s^{-1}), and we discuss its origin.

태양/태양계

[구 SS-01] Observation of the Rebound Shock Waves and the EUV Brightening of a Light Bridge Jet

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Hα jets of cool chromospheric plasma are protruding into the solar corona 10-100 Mm above the photosphere. The driving mechanisms of Hα jets have been widely studied for decades. However, the detailed process is still elusive. We observed shock signatures moving along a dark jet using 1.6 meter Goode Solar Telescope at Big Bear Solar Observatory. The first shock front of the jet shows sharp --- when it moves upward, while fuzzy and granulated when it moves downward. The jet itself extends upward when the second shock front of the jet reaches the top of the jet. We find abrupt EUV brightenings when the second shock front collides with the edge of the jet. The third front and the fouth front quasi-periodically. These phenomena might be the signs of the rebound shock waves triggered by p-mode wave leakages at the bottom of the jets. Our observation suggests that the jet can be triggered by the rebound shock waves generated by the p-mode waves leaked at the bottom of the jets.

[구 SS-02] Development of a diagnostic coronagraph on the ISS: progress report

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The Korea Astronomy and Space Science Institute (KASI) has been collaborating with the NASA Goddard Space Flight Center (GSFC), to install a diagnostic coronagraph on the International Space Station (ISS). The coronagraph is designed to obtain simultaneous measurements of electron density, temperature, and velocity using multiple filters in the 3-10 Rs range. In 2019, we developed a new coronagraph and launched it on a stratospheric balloon (BITSE) from Fort Sumner, New Mexico in USA. As the next step, the coronagraph will be further developed, installed and operated on the ISS (CODEX) in 2023 to understand the physical conditions in the solar wind acceleration region, and enable and validate the next generation space weather models. In this presentation, we will report recent progress and introduce future plan.

[구 SS-03] Investigation of sunspot substructure using chromospheric bright patches in a merging sunspot

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Sunspot substructure is an important subject to explain their stability and energy transport. Previous studies suggested two substructure models, monolithic and spaghetti model, but no clear evidence has been found supporting a particular model. To obtain the clue of the sunspot substructure the IRIS Mg II 2796Å slit-jaw images (SJI) were examined. The Mg II images formed in the chromosphere show bright patches inside umbrae which are regarded as an observational signature of upward propagating slow magnetohydrodynamic (MHD) waves. The slow MHD waves are expected to be generated by convective motion below the photosphere. By tracking the motion of the bright patches it is possible to estimate the locations of oscillation centers that correspond to the occurrence position of the convections. I investigated the spatial distribution of the oscillation center in a merging sunspot and found it is randomly distributed. It implies that the occurrence rate of the convective motion inside the sunspot is not much different from that of between the two sunspots, and supports the spaghetti model as the sunspot substructure.

[구 SS-04] Inference of Chromospheric Plasma Parameters on the Sun from Strong Absorption Lines

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