Administration (NASA) which will be installed on the International Space Station (ISS). The coronagraph can measure speed and temperature by using four filters approximately 400 nm and polarization filter in three different angles, differently with older coronagraphs. For the successful mission, it has development and experiment progress in three phases; total solar eclipse experiment in 2017, balloon experiment in 2019, and the ISS installation in 2021. As a first experiment, we developed a coronagraph without an occulter named with Diagnostic Coronagraph Experiment (DICE) for experiment for filter system and imaging sensor. We designed optics with a field of view from 2.5 to 15 solar radii. It has four filters approximately 400 nm and polarizer to measure speed and velocity of the solar corona. For the selection of filter or polarization angle, it has two mechanism parts; filter wheel assembly and a polarizer wheel assembly. Especially we used Core Flight System (CFS) platform which was developed by NASA, when we develop the coronagraph operation software. It provides us stability, reusability, and compatibility.

[구 TG-03] Simulation and Experiment Study of the Cylindrical Occulter with Tapered Surface for the Solar Compact Coronagraph (소형 코로나그래프 개발을 위한 원통형 차폐기 성능 실험)

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태양의 코로나를 관측하기 위한 코로나그래프의 가장 중요한 부분은 태양 원반으로부터의 빛을 차단하기 위한 차폐기다. 태양 원반 밝기의1e-6 - 1e-10에 이르는 어두운 외부 코로나(>2Rs)를 관측하기 위해서는 외부차폐기에서 발생하는 회절광을 최소화 하는 것이 중요하다. 우리는 수치실험과 실험실 실험을 통해 원통형 차폐기의 성능을 조사하였다. 수치실험 결과2.5Rs영역을 가리는 원통형 차폐기의 경우0.4um의 파장대역에 대해서 그 벽면 각도가 0.39도일 때 차폐기에 의한 회절광이1e-10Is로 최소가 되었다. 우리는 중국 산동대학교 암터널 실험실에서 시뮬레이션과 일치하는 실험결과를 얻었는데 그 회절광량은 이상적인 경우보다는 조금 더 밝은1e-9Is 수준이었다. 1e-9Is의 회절광량은 일정 간격으로 배치된9장을 겹쳐놓은 차폐기의 이론적인 성능과 비슷한 값으로 외부차폐기/내부차폐기/리오트 스탑/리오트 스팟 등으로 복잡하고 긴 구조의 코로나그래프가 아닌 외부차폐기만을 이용한 짧은 광학계의 소형 코로나그래프로 외부 코로나 관측이 가능함을 보여준다.

[구 TG-04] 2017 Total Solar Eclipse Expedition of KASI

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Korea Astronomy and Space Science Institute (KASI) plans to develop a coronagraph to measure the coronal electron density, temperature, and speed using four different filters around 400 nm, where strong Fraunhofer lines from the photosphere are scattered by coronal electrons. During the total solar eclipse occurring on August 21 across USA, KASI will organize an expedition team to demonstrate the coronagraph measurement scheme and the instrumental technology. The observation site is in Jackson Hole, Wyoming, USA. We plan to build two coronagraphs without occulter to improve signal to noise ratio. In addition, images of white light corona, wide field background, and all sky are planned to be taken with DSLR cameras. We will present the preliminary results of the expedition.

[구 TG-05] Plasma Outflows along Post-CME Rays

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Bright rays are often observed after coronal mass ejections (CMEs) erupt. These rays are dynamical structures along which plasmas move outward. We investigated the outflows along the post-CME rays observed by the COR2 on board STEREO Behind on 2013 September 21 and 22. We tracked two CMEs, two ray tips, and seven blobs using the NAVE optical flow technique. As a result, we found that the departure times of blobs and ray tips from the optimally chosen starting height of 0.5 R$\odot$ coincided with the occurrence times of the corresponding recurrent small flares within 10 minutes. These small flares took place many hours after the major flares. This result supports a magnetic reconnection origin of the outward flows along the post-CME ray and the importance of

magnetic islands for understanding the process of magnetic reconnection. The total energy of magnetic reconnection maintaining the outflows for 40 hr is estimated at 1.4 ´ 1030 erg. Further investigations of plasma outflows along post-CME rays will shed much light on the physical properties of magnetic reconnection occurring in the solar corona.

[구 TG-06] Determination of 2D solar wind speed maps from LASCO C3 observations using Fourier motion filter

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Measurements of solar wind speed near the Sun (< 0.1 AU) are important for understanding acceleration mechanism of solar wind as well as space weather predictions, but hard to directly measure them. For the first time, we provide 2D solar wind speed maps in the LASCO field of view using three consecutive days data. By applying the Fourier convolution and inverse Fourier transform, we decompose the 3D intensity data (r, PA, t) into the 4D one (r, PA, t, v). Then, we take the weighted mean along speed to determine the solar wind speeds that gives V(r, PA, t) in every 30 min. The estimated radial speeds are consistent with those given by an artificial flow and plasma blobs. We find that the estimated speeds are moderately correlated with those from slow CMEs and those from IPS observations. A comparison of yearly solar wind speed maps in 2000 and 2009 shows that they have very remarkable differences: azimuthally uniform distribution in 2000 and bi-modal distribution (high speed near the poles and low speed near the equator) in 2009.