demonstrate that a solar eruption is caused by the imbalance between magnetic pressure gradient force and magnetic tension force. We conclude that this imbalance is produced by a weak but continuously existing solar wind above an active region.

[구 SS-09] Development of Full ice-cream cone model for HCME 3-D parameters

Hyeonock Na, Yong-Jae Moon, and Harim Lee
School of Space Research, Kyung Hee University, Korea

The determination of three dimensional parameters (e.g., radial speed, angular width, source location) of Coronal Mass Ejections (CMEs) is very important for space weather forecast. To estimate these parameters, several cone models based on a flat cone or a shallow ice-cream cone with spherical front have been suggested. In this study, we investigate which cone model is proper for halo CME morphology using 26 CMEs which are identified as halo CMEs by one spacecraft (SOHO or STEREO-A or B) and as limb CMEs by the other ones. From geometrical parameters of these CMEs such as their front curvature, we find that near full ice-cream cone CMEs are dominant over shallow ice-cream cone CMEs. Thus we develop a new full ice-cream cone model by assuming that a full ice-cream cone consists of many flat cones with different heights and angular widths. This model is carried out by the following steps: (1) construct a cone for given height and angular width, (2) project the cone onto the sky plane, (3) select points comprising the outer boundary, (4) minimize the difference between the estimated projection speeds with the observed ones. We apply this model to 12 SOHO halo CMEs and compare the results with those from other stereoscopic methods (a geometrical triangulation method and a Graduated Cylindrical Shell model) based on multi-spacecraft data.

[구 SS-10] Comparison between quasi-linear theory and particle-in-cell simulation of solar wind instabilities

Junga Hwang[1,2], Jungjoon Seough[3], Peter H. Yoon[4,5]
[1]*Korea Astronomy and Space Science Institute*
[2]*Korea University of Science and Technology*
[3]*University of Toyama, Japan*
[4]*University of Maryland*
[5]*Kyung Hee University*

The protons and helium ions in the solar wind are observed to possess anisotropic temperature profiles. The anisotropy appears to be limited by various marginal instability conditions. One of the efficient methods to investigate the global dynamics and distribution of various temperature anisotropies in the large-scale solar wind models may be that based upon the macroscopic quasi-linear approach. The present paper investigates the proton and helium ion anisotropy instabilities on the basis of comparison between the quasi-linear theory versus particle-in-cell simulation. It is found that the overall dynamical development of the particle temperatures is quite accurately reproduced by the macroscopic quasi-linear scheme. The wave energy development in time, however, shows somewhat less restrictive comparisons, indicating that while the quasi-linear method is acceptable for the particle dynamics, the wave analysis probably requires higher-order physics, such as wave-wave coupling or nonlinear wave-particle interaction. We carried out comparative studies of proton firehose instability, aperiodic ordinary mode instability, and helium ion anisotropy instability. It was found that the agreement between QL theory and PIC simulation is rather good. It means that the quasilinear approximation enjoys only a limited range of validity, especially for the wave dynamics and for the relatively high-beta regime.

태양계

[구 SS-11] Seasonal Variations of the Zodiacal Light toward the Ecliptic Poles at the Infrared Wavelengths

Jeonghyun Pyo[1], Il-Joong Kim[1], Woong-Seob Jeong[1,2], Dae-Hee Lee[1], Bongkon Moon[1], Youngsik Park[1], Sung-Joon Park[1], Won-Kee Park[1], Duk-Hang Lee[1,2], Uk-Won Nam[1], Wonyong Han[1,2], Kwang-Il Seon[1,2], Toshio Matsumoto[3], Min Gyu Kim[4], Hyung Mok Lee[4]
[1]*Korea Astronomy and Space Science Institute,* [2]*University of Science & Technology,* [3]*ISAS/JAXA, Japan,* [4]*Seoul National University*

The zodiacal light (ZL), combination of the sunlight scattered by and the infrared light emitted by the interplanetary dust (IPD) particles, changes with time due to the asymmetric distribution of the particles with respect to the Earth's orbit. Especially, the variation of the ZL brightness toward the ecliptic poles are useful to probe the