[II-1-4] Study of synchrotron photons by the Prototype Synchrotron Radiation Detector in the space

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A space shuttle with a Prototype Synchrotron Radiation Detector (PSRD) was launched in 2001. PSRD was set in the Endeavour payloads and got data for 12 days. The purpose of PSRD is to measure synchrotron photons which are created by high energy charged particles near earth. Synchrotron photons are confused with background photons. We studied how to separate synchrotron photons from backgrounds.

[II-1-5] Absolute Dimensions of Fifteen High Mass Main Sequence Eclipsing Binaries

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We presented the accurate absolute dimensions and distances of fifteen main sequence eclipsing binaries. The photometric and spectroscopic solutions of the binary systems were determined by analyzing light curves and radial velocity curves collected from the literature using the Wilson-Devinney computer code. The fifteen double-line spectroscopic binaries consist of nine detached systems; QX Car, AH Cep, CW Cep, ZZ Cep, XY Cet, RX Her, V451 Oph, VV Pyx and V760 Sco, six semi-detached systems; LY Aur, IU Aur, AO Cas, DM Per, V Pup and HU Tau. The temperatures of the binary systems were determined from their colors using the color-temperature calibrations. Then the temperature of each component star were determined using the temperature ratio which was adjusted from the light curves. We estimated the possible Z values and ages for the detached systems by adopting the Y2 (Yonsei-Yale) stellar evolutionary tracks. The derived distances are in good agreement of the Hipparcos distances whose error of parallax is within 10 %. Finally these well-investigated systems will be used as the standard eclipsing binaries.

■ Session III-1 : Space Environment 1
Wednesday, 22 October [16:30-17:30]

[III-1-1] Simulations of nonlinear field line resonances

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In this study, the nature of nonlinear field line resonances (FLR) is studied by adopting full MHD simulations. The MHD code used here is based on the total variation diminishing (TVD) scheme and we have performed numerical simulations of FLR with its three-dimensional code. If the source perturbation is strongly impulsive and thus the timescale of the initial variations is sufficiently smaller than the convection timescale, FLRs are easily confirmed in these simulations. When the disturbance is sufficiently small, it is shown that linear properties of MHD wave coupling are well reproduced. In order to examine nonlinear nature of FLR, wave spectra, Poynting flux and energy distribution are studied at resonances as the magnitude of initial disturbance gradually increases.

[III-1-2] Effects of solar variations on standing Alfven waves in the dayside magnetosphere: Polar observations

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In March and April 2001, the apogee (~9 Re) of the Polar spacecraft was located near the subsolar magnetopause with its orbital plane nearly parallel to a magnetic meridian plane. Polar electric and magnetic field data acquired during the two-month interval of solar maximum have been used to study fundamental standing Alfven waves near the subsolar meridian plane (magnetic local time = 1000-1400 hours) at magnetic latitudes from the equator to ±45 degrees and at L values between 7 and 12. In the frequency band from 1.5 to 10 mHz, fundamental mode oscillations were identified based on high coherence (more than 0.7) and an approximately 90-degree phase shift between the azimuthal magnetic and radial electric field components. The L dependence of the fundamental frequencies is studied, and the frequencies are compared with those observed near the solar minimum interval (Takahashi et al. 2001). We found that the average frequencies in solar maximum are lower than those in solar minimum by a factor of ~2. This implies that the mass density in solar maximum is higher than that in solar minimum by a factor of ~4. Since there is a positive correlation between solar irradiance and solar activity, we suggest that the ionosphere in solar maximum produces more ions and load magnetic flux tubes with more ions.