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Section 6. Solar Emission and Related Terrestrial Phenomena

The observations of interplanetary scintillations of radio sources have been continued at Toyokawa, Fujigane, and Sugadaira.

The solar wind velocity in high heliographic latitudes up to 64°N has been derived from the interplanetary scintillation of 3C48 in 1972 and 1973, and the relation between latitudinal distribution of the solar wind velocity and of the brightness of solar EUV corona has been examined. In May-June 1972 the solar wind velocity tended to increase with increasing heliographic latitude of the source of observed solar wind, while the intensity of the EUV corona weakened with increasing latitude. In May-June 1973 the solar wind velocity did not noticeably increase with latitude, and average brightness of the EUV corona in low and high latitudes was approximately the same. Hence it is suggested that the latitudinal distribution of the solar wind velocity is inversely related to the brightness distribution of the solar EUV corona.

Watanabe has examined the relation between the solar wind velocity and the brightness of solar EUV corona, using the velocity data obtained by the space probes and by the scintillation method. The solar wind velocity has a general tendency to decrease with increasing EUV brightness at the solar wind source, and the high-velocity solar wind flows out from the EUV coronal hole. This result agrees with the previous investigation. Furthermore, he has found that the active region with multipolar magnetic field (γ-type sunspot group) is the source of high-velocity solar wind in spite of its high EUV brightness.

Using a reductive perturbation method, Washimi has discussed the self-focusing of plasma waves propagating along an applied magnetic field in a plasma, and has derived the cylindrically symmetric nonlinear Schrödinger equation for these waves. It has been shown that the threshold power for the self-focusing become very small for whistler wave and Alfvén wave at special frequencies. He has also derived

the Schrödinger-type wave equations for the transverse waves propagating along an applied magnetic field in inhomogeneous plasmas, and has discussed the propagations of the electromagnetic, the whistler, and the Alfvén waves in the magnetosphere. The ducted propagations of these waves and the existence of the upper-cutoff frequency near the one-half of the electron cyclotron angular frequency at the top of the magnetic field line, $\omega_{ceo}/2$, have been explained. Furthermore, the eigen-intensity profiles of the waves, the quantitative conditions for the ducted propagations, and the relations between the derived wave equations and the ray-trapping theory of the whistler wave have been discussed, and a comment on the triggered VLF emissions which are detected for the transmitted wave of $\omega_{ceo}/2$ has been given.

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- Takakiyo KAKINUMA -

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