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Section 3. Radio Astronomy

An integrated report on bursts in 1982 observed by Fully Automatic Radiopolarimeters will be published shortly as Atlas of Solar Radio Bursts for 1982 (Enome et al. , 1983).

Regular calibrations of the λ 8-cm radioheliograph are being made about once a week of phases and gains of element antennas making use of the control system of the radioheliograph (Nishio , 1980, Kobayashi and Takata, 1982). Latest results of calibrations and a full introduction of the improved system are being described and will be submitted (Nishio et al., 1983).

A new project is told to be financed in fiscal years 1983 and 1984 to install a multi-channel correlator backend to improve the time resolution and the dynamic range of the λ 8-cm radioheliograph, which has been described already in part (Nishio et al., 1982). A detailed design and specifications of the correlator backend are in progress to minute points of the overall system, each sub-system and its interfaces.

A new receiver system and a control system were installed to the 10-m diameter antenna of AZ-EL type mounting at Toyokawa. The receiver system consits of five frequency bands which cover 1 - 2, 2 - 4, 4 - 8, 8 - 12.4, 12.4 - 18 GHz respectively. This antenna will be used to monitor signals from geostationary satellites, presently two of which at 135 degrees east and 85 degrees east interfer the solar radio observations at 3.75 GHz at Toyokawa around vernal and autumnal equinoxes. It is also possible to track the Sun at any frequency within the coverage (Tsukamoto et al., 1983).

The Solar Maximum Year has changed its phase into the Solar Maximum Analyses. Some results of analyses associated with SMY are coming out from our observatory. Emissions from the Hale region 16898, observed in radio wavelength (Westerbork Synthesis Radio Telescope), ultraviolet (SMM/UVSP), and soft X-ray (SMM/XRP) are spatially resolved. Most of radio components are well explained in terms of the gyroresonance abosorption and the thermal free-free emission. The

emission associated with the merging of a small sunspot group into a large spot is not accounted for by any thermal mechanism and hence nonthermal mechanism is proposed (Shibasaki et al., 1983).

An interpretaion of the X-ray to gamma-ray delay observed in June 7, 1980 event was presented in terms of the thick-target trap model at the Workshop on Impulsive Solar Gamm-Ray Flares on June 7 and 21, 1980 held at the University of New Hampshire in May 1982 (Enome et al., 1982).

An introductory talk on HINOTORI - A Japanese Satellite for Solar Flare Studies was given at the SMY Symposium in Ottawa at the XXIV Plenary Meeting of COSPAR in May 1982 (Enome, 1983a).

Relations between narrow-band decimeter bursts and X-ray emissions were examined based on data from Toyokawa, HINOTORI/HXM, and HINOTORI/FLM. Some new results were found, in which narrow-band decimeter bursts were associated in time with the peak of soft X-ray emissions but with very weak or no hard X-ray emissions. A tentative interpretation is presented in terms of the negative absorption or the maser effect at the US-Japan Seminar on Recent Advances in the Understanding of Solar Flares held at Tokyo in October, 1982 (Enome, 1983b).

The X-ray to gamma-ray delay of 45 sec for the flare of April 27, 1981 is accounted for in terms of the thick-target trap model to give the ambient density of 3×10^{11} cm^{-3}, which is rather in good agreement to the plasma density of 10^{11} cm^{-3} obtained from the analysis of FeXXVI lines of HINOTORI/SOX of the same event (Tanaka, 1983). This result and preliminary analysis of correlation between narrow-band decimeter bursts and SMM/HXRBS were reported at SMM Workshop at GSFC/NASA held in January, 1983.

Planning of a multi-billion-yen project is initiated among Japanese solar radio astronomers to construct a 10-arcsec resolution radioheliograph available at the next solar maximum. Organized studies are in progress on definition of objectives, and design and feasibility of the system.

K.-I. Morita moved to the Nobeyama Radio Observatory, Tokyo Astronomical Observatory in June, 1982 to fulfill his postdoctral fellowship there.

K. Shibasaki attended the NRAO-VLA Workshop on Synthesis Mapping held at Socorro, New Mexico in June 1982.

S. Enome attended the Workshop on Impulsive Solar Gamma-Ray Flares on June 7 and 21, 1980 held at Durham, New Hampshire in May 1982, the SMY Workshop at Ottawa in May 1982, and SMM Workshop at GSFC/NASA in

January 1983.

February 26, 1983
- Shinzo ENOME -

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