

# A purely Polarized Radio Source Associated with NOAA 7260

Kiyoto SHIBASAKI, Shinzo ENOME, Hiroshi NAKAJIMA, Masanori NISHIO, Toshiaki TAKANO,  
Yoichiro HANAOKA, Chikayoshi TORII, Hideaki SEKIGUCHI, Susumu KAWASHIMA,  
Takeshi BUSHIMATA, Noriyuki SHINOHARA, Hideki KOSHIISHI, and Yasuhiko SHIOMI

*Nobeyama Radio Observatory, National Astronomical Observatory, Minamimaki, Minamisaku, Nagano 384-13*

## Abstract

A purely polarized bright radio source was found at 17 GHz by the Nobeyama Radioheliograph. This source was associated with a large sunspot of NOAA 7260. The source structure of this S-component was resolved due to high spatial resolution of the radioheliograph. A soft X-ray image of this active region taken by Yohkoh Satellite shows no counterpart for the radio source. Emission mechanism of the radio source is identified as gyroresonance. Magnetic field of the sunspot was measured by the Haleakala Vector Magnetograph at Mees Solar Observatory. The field strength at the half power level of the radio source was 2000 gauss at the photospheric level. This correspond to the third harmonic layer. A bright soft X-ray loop, whose footpoint is at the penumbra of the large sunspot, can also be seen in the radio map. This loop is strongly curved, to form a part of spiral, which reflects strong electric current. Vector magnetogram shows strong rotation of the transverse field in the sunspot, which also corresponds to strong electric current. Due to this current and also to the density and the temperature enhancement near the X-ray loop, the radio peak is shifted toward the loop and has no dip.

The sense of the circular polarization of the radio source was left handed which corresponds to the extraordinary mode. In the course of the solar disk transit of the active region, the sense changed to right handed. This polarization reversal occurred near W60. No reversal was found in the eastern hemisphere. The reversal of the circular polarization can be interpreted as the result of the mode coupling when the radio wave crosses the quasi transverse magnetic field in the active region.

## Reference

Shibasaki, K., Enome, S., Nakajima, H., Nishio, M., Takano, T., Hanaoka, Y., Torii, C., Sekiguchi, H., Kawashima, S., Bushimata, T., Shinohara, N., Koshiishi, H., Shiomi, Y. and Irimajiri, Y. 1994, *Publ. Astrn. Soc. Japan*, **46**.