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RADIO EMISSION FROM WOLF-RAYET BINARIES

Three Wolf-Rayet binaries have been examined for radio emission with the NRAO* three element interferometer. The Wolf-Rayet systems observed were CV Ser (WC8 + B0:), V 444 Cyg (WN5 + O6), and HD 193793 (WC7p + O5). Based on the infrared excesses and electron densities given by Hackwell, et al. (1974), detectable radio emission was considered likely.

The radio observations were made during October 18-25, 1975. The stars were observed simultaneously at 3.7 cm (8085 MHz) and 11.1 cm (2695 MHz). The interferometer spacings used were 900, 1800, and 2700 meters. At least 19 hours were spent observing each star.

A radio source was observed to coincide with the optical position of HD 193793. The radio position agrees with the AGK 3 position, allowing for proper motion, to within 0.5 arc seconds. The radio source was unresolved, indicating an angular diameter of less than 0.5 arc seconds. The observed flux densities for HD 193793 were 21.0 ± 1.0 mJy** and 26.2 ± 1.1 mJy at 3.7 cm and 11.1 cm, respectively. During the time HD 193793 was observed, October 23-25, no variability was observed within the sensitivity limits of the observations. The daily mean flux density values repeat to within 4 mJy. Short term variations, having a time scale of about one hour and an amplitude of 8 mJy, can not be ruled out.

No radio emission at either frequency was observed from either CV Ser or V 444 Cyg. An upper limit for the radio emission for these stars is approximately 2 mJy. Since radio emission from binary stars is highly variable, radio emission from CV Ser and V 444 Cyg should not be discounted.

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** 1 mJy = 10^{-29} W m⁻² Hz⁻¹

Reference:

Hackwell, J. A., Gehrz, R. D., and Smith, J. R. 1974, Ap. J., 192, 383