# RADIO OBSERVATIONS OF O-TYPE STARS

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Eight O-type giants and supergiants, selected for being relatively isolated in the sky, have been observed at 5 GHz with 17 antennae of the partially completed VLA (NRAO, Socorro, New Mexico: The National Radio Astronomy Observatory is operated by Associated Universities under contract with the National Science Foundation) on October 7 and 8, 1979. The integration times ranged between 38 and 187 minutes. The results are displayed in Table 1. Most of the stars (6 out of 8) were not detected. The upper limits given in Table 1 for these stars correspond to the 3σ noise level. Possible detection has been achieved for the two supergiants HD 225160 and HD 30614 both with a flux density of 0.15 mJy. Although this flux is equal to the 3σ noise level, the detections can be considered to be real because 1) Excellent positional coincidence is found between stars and the radio peaks (better than 1") 2) The observed source pattern corresponds very well to the expected response to a point-like source.

The mass loss rates have been computed by using the formulae of Panagia and Felli (1975). The spectral types and the distances to the stars have been taken from the Catalogue of Cruz-Gonzalez et al.(1974). The terminal velocities have been estimated by means of an average $v_{term}$-$T_{eff}$ relationship (Panagia and Macchetto, 1981). The upper limits are all consistent with the mass loss rates appropriate for stars of comparable spectral type and luminosity class (cf. Tanzi et al., 1981). In particular, the missed detection of the Of star HD 162978 confirms that the Of characteristic may not be enough to ensure an especially high mass loss rate.

As for the two detected stars, the mass loss rate determined for HD 30614 agrees quite closely with the average found for late O-type supergiants (Tanzi et al., 1981). On the other hand, the value derived for HD 225160 is one of the highest ever measured. This result becomes even more exceptional if one considers the ratio of the mass loss rate to the luminosity which is $\dot{M}/L = 3.6 \times 10^{-11}\ M_{\odot}\ yr^{-1}\ L_{\odot}^{-1}$. Compared with the distribution of $\dot{M}/L$ for O-type supergiants (Tanzi et al., 1981), this ratio differs about four standard deviations from the mean value.



*C. Chiosi and R. Stalio (eds.), Effects of Mass Loss on Stellar Evolution, 179–180.*

Table 1. Summary of Radio Data

| Star | Spectral Type | Log $\frac{L}{L_\odot}$ | S(5GHz) (mJy) | Log $\dot{M}$ ($M_\odot$ $yr^{-1}$) |
|---|---|---|---|---|
| HD 175876 | 06.5 III n (f) | 5.50 | < 0.32 | < -4.75 |
| HD 225160 | 08 Ib (f) | 5.52 | 0.15 | -4.92 |
| BD -11°4586 | 08 I | 5.76 | < 0.27 | < -4.84 |
| HD 175754 | 08 III f | 5.36 | < 0.30 | < -4.85 |
| HD 162978 | 08.5 III f | 5.36 | < 0.27 | < -5.26 |
| HD 209481 | 08.5 III + 09.5 V | 5.36 | < 0.15 | < -5.51 |
| HD 207198 | 09 I | 5.76 | < 0.15 | < -5.49 |
| HD 30614 | 09.5 I | 5.71 | 0.15 | -5.77 |

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