

KINEMATIC DISTANCES OF PLANETARY NEBULAE

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Most distances of planetary nebulae are known roughly within a factor of 2 or larger, except for some special objects for which the uncertainty can be as low as 50%. In the present work both IUE interstellar Lyman alpha profiles and 21 cm HI line surveys are used to infer the distances of four planetary nebulae.

From the measured Lyman alpha equivalent width the column density of neutral H can be determined. On the other hand, for a given 21 cm profile a LSR velocity can be obtained which corresponds to the same amount of gas as that producing the Lyman alpha absorption. Through the use of a galactic rotation curve the distance of the nebula can be estimated.

This procedure has been applied to the planetary nebulae NGC 7009, BD + 30°3639, NGC 7662 and IC 418, for which both Lyman alpha profiles and 21 cm observations were available. For these nebulae kinematic distances were obtained as well as plots of the H column density against distance. The results have been compared with distances obtained by different authors, in particular with extinction distances, which are generally considered as accurate. Finally, a discussion is included on the main sources of error on the derived distances.

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DISTANCE DETERMINATIONS FROM 21 cm INTERSTELLAR ABSORPTION-LINE MEASUREMENTS

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HI observations at 21 cm have been made with the Westerbork Synthesis Radio Telescope in the direction of six planetary nebulae located in or near the galactic plane (N 7027, 2440, 6537, 6572, 7026, 7354).

Measurements of 15 other nebulae are in progress. The spectral resolution is 4 km s^{-1} with a total velocity range of about 125 km s^{-1} .

In all nebulae at least one absorption line was present, due to absorption in the interstellar medium in the local arm. For several of the nebulae a second absorption line was found, which from its velocity can be identified with the Perseus-arm or the Sagittarius-arm, indicating that these nebulae are either in or beyond the respective arm. Upper limits to the distance can be found by noting the absence of absorption from an arm further away. For example: the 21 cm line profile of NGC 2440 shows, besides local absorption, an absorption at a LSR-velocity $\approx +25 \text{ km/s}$. Assuming that this absorption is caused by galactic HI, this leads to a kinematic distance $\approx 2 \text{ kpc}$. The resultant distances are probably accurate to within 50%.

As a by-product of this work a limit can be placed on the amount of neutral hydrogen associated with the nebula as indicated by absorption at the nebular velocity. The value is often quite low. The results for NGC 7027 have recently been published (Pottasch et al., 1982).

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OH/IR STARS NEAR THE GALACTIC CENTRE

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We have detected 34 OH/IR stars within 1 degree of the galactic centre by their OH emission line at 1612 MHz (18 cm) using the Effelsberg 100 m telescope and the Very Large Array. The spatial distribution and the distribution of the radial velocities show that practically all stars are within 150 pc from the Galactic centre, and that the number of foreground objects is very small. The projected distribution of the stars is similar to that of the surface brightness at $2.4 \mu\text{m}$. Since the $2.4 \mu\text{m}$ radiation is supposed to be due to red giants, the OH/IR stars are probably members of the same population. The stars have considerable