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TÍTULO:

AN INFRARED STUDY OF GALACTIC OH/IR STARS

ESTUDIO EN EL INFRARROJO DE ESTRELLAS OH/IR GALÁCTICAS

Trabajo dirigido por:

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RESUMEN/ABSTRACT:

In this thesis work we present a study of galactic OH/IR stars carried out mainly in the infrared wavelength range, although we have also used optical and radio data for the analysis.

Firstly, we have analysed 371 IRAS sources belonging to the so-called "Arecibo sample of OH/IR stars". Accurate astrometry and single-epoch near-infrared photometry have been obtained, and the main photometric properties of the OH/IR stars in the sample have been determined. The relative distribution of sources with and without optical counterpart in the IRAS two-colour diagram and their characteristic near infrared colours have been interpreted as the consequence of the increasing hickness of their circumstellar shells.

Subsequently, we have extend the same kind of analysis to a sample of 94 OH/IR stars belonging to the GLMP catalogue (the "GLMP sample") presenting much redder colours.

As a by-product, we have created the largest atlas of OH/IR stars existing up to date. This atlas consists of optical and near-infrared finding charts for a total of 465 OH/IR stars, all of them studied in this thesis.

With the whole sample of OH/IR stars (what we have called the "extended sample", including both Arecibo and GLMP sources) we have interpreted the colour sequence displayed by the OH/IR stars in the IRAS two colour [12]-[25] vs. [25]-[60] diagram (the "O-rich AGB sequence") in terms of evolutionary stage and/or progenitor masses. To reach this goal we have previously determined the luminosity distribution of a subsample of GLMP OH/IR stars located in the direction of the Galactic Bulge, assuming that they are all bulge population stars and, thus, a common distance for all them equivalent to the distance to the Galactic Centre. Because of the strongly peaked distribution found (at a luminosity of $3,500 L_{\odot}$) we have assumed this value for the remaining OH/IR stars as a first guess of their true luminosity. This way we have explored both their distance and galactic height distribution.

Finally, we have studied in detail the variability properties of a "small" sample of 25 galactic sources selected from the IRAS Point Source Catalogue as candidate long-period variable stars in the late-AGB phase. The results presented are the output of a monitoring program carried out over a period of more than 10 years. Our study also includes the detailed analysis of the light curves derived, which show that in many cases they are far from symmetrical and show secular variations which are yet unexplained. The results obtained are discussed in the context of stellar evolution.

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