

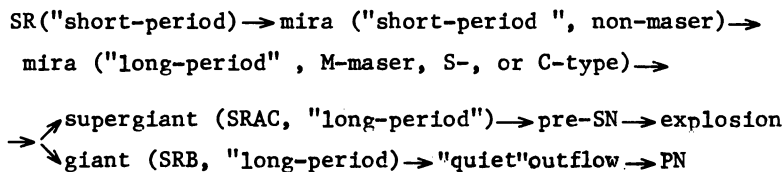
SOME DEPENDENCES FOR LONG-PERIOD VARIABLES AND A POSSIBLE SCHEME OF THEIR EVOLUTION

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ABSTRACT. Some dependences between the parameters for approximately 150 stars, of which 81 are sources of maser emission in molecular lines, are constructed. The following parameters are considered: period P , asymmetry ($M-m$) of the visual light curve, visual amplitude A , color index ($I-K$). We use the data of the General Catalogue of Variable Stars. For the stars Z Cyg, R Tau, R Peg, RT Vir, RX Boo, PZ Cas, U Her, and R Cas, some parameters were determined by the authors.

On the $A - (M-m)$ plot, the maser LPVs lie, on the average, higher than the non-maser ones; the SR stars lie lower. With increasing A , ($M-m$) varies but very weakly. From the $A - P$ plot it can be concluded that for "short-period" LPVs ($P < 280^d$), A for all stars is almost the same. For the "longer-period" stars ($P > 280^d$), ($M-m$) varies strongly. It can be supposed that, with increasing P , light curve becomes very non-stationary and its asymmetry varies from one cycle to another.

We discuss the dependences found from the point of view of the character of the LPVs' pulsational instability at different stages of evolution. In our opinion, different peculiarities of the LPVS' light variations allow to construct the following evolutionary scenario for these stars:



The choice of the pathway after the "long-period"-mira stage depends on the star's mass. However, only the most massive stars ($M \gtrsim 10 M_{\odot}$) may follow the branch ending in an SN explosion. Less massive ones ($5 - 10 M_{\odot}$) may lose a few solar masses in the violent mass loss stage, forming thick circumstellar shells ("black" planetary nebulae); these objects may be observable as OH/IR stars. Finally, low mass stars ($1 - 5 M_{\odot}$) form, through "quiet" mass outflow, "ordinary" PN.