Violation of the Core Mass - Luminosity Relation for AGB models which experience the third dredge-up

F. Herwig[1], **D. Schönberner**[1], **T. Blöcker**[2]
[1] Astrophysikalisches Institut Potsdam (AIP),
An der Sternwarte 16, D-14482 Potsdam, Germany.
[2] Max-Planck-Institut für Radioastronomie,
Auf dem Hügel 69, D-53321 Bonn, Germany.

contact e-mail: fherwig@aip.de

The *third dredge-up* phenomenon of thermal pulse AGB stars is responsible for the enrichment of the stellar envelope with elements which originate from the nuclear processes within the shell burning regions. While today the observational evidence for this mechanism is well established the stellar evolution models usually fail to reproduce the required amount of dredge-up for core masses of $0.6M_\odot < M_\mathrm{H} < 0.8M_\odot$.

We have carried out complete evolutionary calculations of thermal pulse AGB stellar models which consider overshoot according to an exponential diffusive algorithm (Herwig et al. 1997). The models do show a considerable amount of dredge-up.

In this contribution we investigate the influence of the dredge-up mechanism on the prediction of the Core Mass - Luminosity Relation. We show that models of the above mentioned range of core masses, wich experience strong dredge-up, do not follow the classical linear Core Mass - Luminosity Relation (Herwig 1998). While the effect of dredge-up is a reduction of the core mass growth after the thermal pulse the luminosity continues to steadily increase from pulse to pulse.

References:

- Herwig F., Blöcker T., Schönberner D. & Eid M. E. 1997, A&A 324, L81
- Herwig F., 1998, PhD Thesis, Universität Kiel