REFINING THE FUNDAMENTAL PARAMETERS OF THE 3 POST-AGB STARS: HR 4049, HD 52961 AND HD 133656 USING IMPROVED MODEL ATMOSPHERES

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The recent availability of improved model atmospheres covering a wider range of abundances has prompted us to reanalyse the UV to IR spectral energy distribution (SED) of several post-AGB stars. We present here results for HR 4049, HD 52961 and HD 133656. Our major incentive has been to :

- i) redetermine the effective temperature and surface gravities of these stars by looking for the models (not necessarily unique) which best fit the photospheric continuum (ie. the Balmer Jump and Paschen continuum) and compare our determinations with previous ones using older models or other methods.
- ii) look for an ultraviolet deficiency with respect to the photospheric flux.

1. Data and models

The data used to construct the energy distributions are low dispersion IUE spectra and Geneva photometry. The observed SEDs were further corrected for interstellar reddening using Savage and Mathys (1979) extinction law. The theoretical SEDs are LTE, RE, line blanketed models computed with the ATLAS9 code. Molecular opacity was not taken into account. Grids of models were calculated for various effective temperatures, surface gravities and the most likely metallicity from the literature.

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2. Results:

The SED of **HD 52961**, corrected for interstellar reddening with E(B-V) = 0.04, is best fit by a model with T_{eff} = 6000K, $logg$ = 1.50 and [M/H]= -5.0 in agreement with Waelkens et al (1991) who determined [Fe/H] = -4.8. A slight UV deficiency appears with respect to the model but may not be real.

The SED of **HD 133656**, corrected for interstellar reddening with E(B-V) = 0.32, is well reproduced by the model T_{eff} = 8750K, $logg$ = 2.5 and [M/H]= -1.0. The effective temperature is significantly higher (by 750K) than that found by Van Winckel et al (1997) who used Kurucz's 1979 models. This results in a large ultraviolet flux deficiency unreported so far. Circumstellar dust optically thick in the UV must be present around the star.

The SED of **HR 4049**, corrected for E(B-V) = 0.10 cannot be reproduced by models of temperature near 10000K and low gravity. Instead, a model T_{eff} = 7500K, $logg$ = 2.0 and [M/H]= -1.0 best reproduces the optical SED . Models with lower metallicity ([M/H] = -5.0) and similar temperatures and gravities do not actually improve the fit of the optical SED but result in larger UV deficiencies. This star should be reclassified as A7II as proposed by Lambert et al (1988). The ultraviolet deficiency respect to the model scales as λ^{-1} suggesting that small particles are responsible for the extinction.

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