propose a scenario linking the high Li abundances of some of these stars to an episodic mass loss and circumstellar ejection event. In our detached spherical thin shell evolutionary model (de la Reza, Drake, & da Silva 1996), every K giant with mass between 1.0 to 2.5 $M_\odot$ becomes Li rich during the RGB stage and the internal mechanism responsible for the Li enrichment will also initiate a prompt mass loss event. The evolutionary paths of the detached shells in the color-color diagram based on *IRAS* density fluxes at 12, 25, and 60 μm are compatible with observations for low expansion velocities of the order of 2 km s^{-1} and mass loss of $(2-5)\times 10^{-8}\ M_\odot \mathrm{yr}^{-1}$. This modest mass loss is, however, two orders of magnitude larger than those of normal, Li poor K giants. A "Li time" (the time for which the K giants present a high, or very high, Li abundances) is of the order of 80 000 years or somewhat larger. This Li phase is, nevertheless, not related to the ^{12}C/^{13}C ratio which appears to evolve, for these low mass stars, over a much longer time. This model requires a rapid internal process of Li enrichment and depletion. The presented evolutionary shell scenario gives a new physical picture of some process occurring during the red giant branch.

de la Reza, R., Drake, N.A., & da Silva, L. 1996, ApJ 456, L115

INFRARED SPECTRAL DIAGNOSTICS OF EVOLVED MASSIVE STARS

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The presence of the 2.058-μm He I 2p-2s singlet in emission has been taken as a signature of a WR wind, for example in the hot emission-line objects discovered near the Galactic Center. This interpretation is not necessarily correct. Indeed the emission line is very sensitive to the wind conditions near the stellar surface: it can be seen in emission only if a strong ultraviolet flux overpopulates the upper level to counteract the branching ratio which strongly favors the 584-Å 2p-1s transition from the same upper level. As for the 2.058-μm absorption component, it reflects the neutral helium density far away in the wind. Hence the 2.058-μm profile and strength are a better diagnostic of the wind radial structure (ionization and density) than of the stellar evolutionary phase. A further complication comes from possible nebular contribution.

We have observed the 2.058-μm line in a number of stars located in the upper left of the HR diagram. In Of supergiants the 2.058-μm feature is usually in absorption only, while in Ofpe/WN9 stars it is in strong emission. However it is also in emission in the ON 9.7 Ia star BD+36 4063 as well as in the O6f supergiant HD 108. In LBV stars, the He I emission is in general absent or at least very weak, as in S Dor, HR Car, AG Car and HD 160529. However a strong emission is observed in He 3–519 and WRA 751.

The origin of the variable emission in three peculiar binaries is not well understood. Between 1995 May and Nov, the emission component observed in the LBV HD 5980 has dramatically decreased and a P Cygni absorption has appeared. In the B[e] binary GG Car the equivalent width of the emission feature has changed from less than 2 Å (McGregor et al. 1988) to 4 Å (our 1994 spectrum). In the WN component of Cyg X-3, the 2.058-μm emission is also known to vary (van Kerkwijk et al. 1992).

WN7 and WN9 Wolf-Rayet subtypes are similar to the OIf stars and display only absorption at 2.058-μm. However both emission and P Cygni absorption are seen in the WN8 subtypes. In earlier WN subtypes, the 2.058-μm line is again seen in absorption only. In WC 8–9 subtypes, the line is observed in emission with a wide range of equivalent widths (and sometimes an absorption component). In earlier WC subtypes, the 2.058-μm emission is blended; absorption is seen in WC6 subtypes but not in WC4–5. The line is totally absent from WO types, due to the high degree of ionization in their winds.

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A GENERAL RELATIVISTIC QUANTUM FIELD APPROACH TO NEUTRON STARS

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In order to draw consistent conclusions in the treatment of a many-body system, it is necessary to keep the dynamical consistency of the approximations used. The dynamical aspects which have motivated this work are related to the absence of the gravitational field and the lack of the general relativity symmetries in Walecka's model. In case of very intense gravitational fields, as for instance, for very dense neutron stars, the field equations of this model may be less appropriate because they do not comply with symmetries demanded by general relativity. Therefore we present a preliminary study, aiming the future development of a neutron star model that explicitly takes into account the presence of the gravitational field, the symmetries of general relativity and the inclusion of rotational dinamical effects, in a consistent way. In the present work we develop a reformulation of the Euler-Lagrange

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