TABLE 1

PARAMETERS OF NGC 6826

| Reference | $T_{\rm eff}$ (kK) | $\log g$ | $\dot{M}$ ($10^{-8}$ $M_\odot$ yr$^{-1}$) | $v_\infty$ (km s$^{-1}$) | $L/L_\odot$ | Distance (kpc) |
|---|---|---|---|---|---|---|
| Pauldrach et al. 2004 (stellar model) | 44.0 | 3.90 | 18.0 | 1200 | 15848 | 3.18 |
| Kudritzki et al. 2006 (stellar model) | 46.0 | 3.80 | 7.94 | 1200 | 12882 | 2.60 |
| Kwitter & Henry 1998 (nebular model) | 50.0 | ··· | ··· | ··· | 186200 | ··· |
| Surendiranath & Pottasch 2008 (nebular model) | 47.5 | 3.75 | ··· | ··· | 1640 | 1.40 |
| This work (stellar-nebular model) | 45.0±2.5 | 3.65±0.2 | 1.50±1 | 1100±100 | 6000±500 | 0.80±0.2 |

several models with different combinations in the values of $L$, $R$, and $M$ can reproduce the observations.

On the other hand, a change in the distance directly affects the size ($R_{\rm in}$, $R_{\rm out}$) assumed for the nebula, as well as the volume of emitting gas. Photoionization models with different combinations of distance, luminosity, and temperature of the ionizing source can reproduce the observations.

## 4. BREAKING THE DEGENERACY

To solve the degeneracy in the parameters of the star and the nebula the critical parameter is the distance. In order to reduce uncertainty in the distance we used the evolutive tracks of Vassilidis & Wood (1994) in conjunction with the dynamic age of the nebula.

The $T_{\rm eff}$ of the CS can be constrained using a line ratio of the same element in two subsequent stages of ionization (e.g., C IV $\lambda$1169/C III $\lambda$1176 ratio).

Distances reported in the literature help to set a distance range. The dynamic age is known from the expansion velocity in observations, for a given distance. We obtained an upper limit to the dynamic age of 30150 yr by assuming $d_{\rm max} = 3.18$ kpc and $v(_{\rm exp})_{\rm min} = 10$ km s$^{-1}$. The lower limit to the dynamic age was fixed in 3700 yr assuming $d_{\rm min} = 0.7$ kpc and $v(_{\rm exp})_{\rm max} = 18$ km s$^{-1}$.

Knowing the dynamic age and temperature of CS is possible to locate it in the evolutive tracks. We use the evolutive tracks of Vassiliadis & Wood (1994). Possible solutions are in the region delimited by $T_{\rm eff}$ and dynamic age range. Every point within this region represent a combination of luminosity, $T_{\rm eff}$, and dynamic age. Assuming as expansion velocity the average of the available data we obtain a distance for each studied model.

Several possible solutions were explored within the area delimited on the evolutive tracks. Several models were obtained for CS, selecting those that best reproduce the observed spectra. These models were used as input to photoionization models in order to reproduce the state of ionization of the nebula.

TABLE 2

ADDITIONAL PARAMETERS FOR NGC 6826

| | |
|---|---|
| Rotational $v \times \sin\ i$ | $70 \pm 15$ km s$^{-1}$ |
| Age | $5000 \pm 1000$ yr |
| $R_{\rm neb}$ | $0.07 \pm 0.01$ pc |

| | Stellar | Nebular | Solar |
|---|---|---|---|
| He | 11.04±0.15 | 11.03±0.15 | 10.93 |
| C | 8.00±0.30 | 8.80±0.30 | 8.30 |
| N | 8.18±0.30 | 7.95±0.30 | 7.78 |
| O | 8.60±0.30 | 8.50±0.30 | 8.60 |

This yields a stellar-nebular self-consistent model.

## 5. RESULTS

Table 1 presents some parameters obtained from a preliminary model of NGC 6826 compared with others works. Table 2 shows additional parameters obtained in this work. With the exception of carbon, the stellar and nebular abundances agree within the errors. The solar value presented was taken from Asplund et al. (2005).

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