

THE LOW LUMINOSITY CENTRAL STAR OF THE PN ESO166–21

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We present low dispersion UV and optical spectrophotometry of the central star of the PN ESO166–21. The stellar spectrum, from 1200 to 6600 Å, is a featureless continuum. The energy distribution is consistent with a black body of $120,000 \pm 20,000$ K. The observed visual magnitude is 18.1.

Ruiz et al. (1989) showed that the nebula is very extended ($\Phi = 160''$) with a spherical shape and bright knots. The emission lines indicate a high ionization degree and the chemical composition shows He and N enrichment, typical of PNe with massive progenitors. We found a nebular expansion velocity of 28 km/s. From these parameters we derived a distance of 1.0 ± 0.2 kpc and we estimated a stellar luminosity of $L/L_{\odot} \cong 20$ and a radius of $R/R_{\odot} \cong 0.01$. From the theoretical evolutionary tracks in the H–R diagram (see Shaw & Kaler 1989) we obtain a mass of about $1M_{\odot}$ and $\log g = 8.4$ for this star.

These parameters correspond to one of the most evolved central stars of PNe indicating that this object is already in the white dwarf cooling sequence. Only a few objects have been reported with these characteristics, among them NGC7293, A21 and A31. These rare objects are very important in the study of the link between white dwarfs and their precursors.

References

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