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# THE STRUCTURE AND STAR-FORMATION HISTORY OF NGC 5461

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**We compute photoionization models for the giant extragalactic H II region NGC 5461, and compare their predictions to several observational constraints. The models are constrained to reproduce the observed density profile, and our analysis takes into consideration the bias introduced by the shapes and sizes of the slits used by different observers.**

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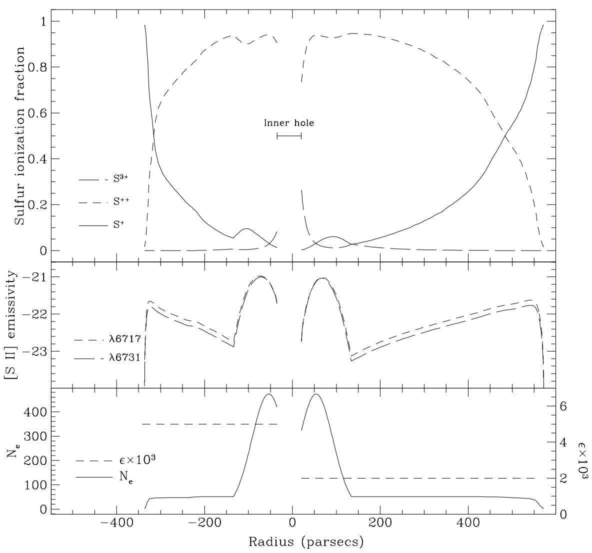


Fig. 1. Selected properties of our best-fit model. Upper panel: Ionization fractions of $S^+$, $S^{++}$, and $S^{3+}$. Middle panel: [S II] $\lambda\lambda 6717, 6731$ emissivities as a function of radius. Lower panel: Density and filling factor as a function of radius.

Our results strongly depend on the assumed density law, since constant density models overestimate the hardness of the ionizing field, affecting the deduced properties of the stellar cluster. We find that an asymmetric nebula with a gaussian density distribution, powered by a young burst of 3.1 Myr, satisfactorily reproduces most of the constraints. Fig. 1 shows some of the features of this model, while Fig. 2 compares the predicted H$\alpha$ and $I(\lambda\,6717)/I(\lambda\,6731)$ profiles to their observational counterparts.

The region can be satisfactorily described as radiation bounded, with no substantial leakage of photons taking place. We estimate a total stellar mass of about $M_*^{\rm tot} = 3\times10^6 M_\odot$ in the (0.01–80)$M_\odot$ range, and an ionized-gas mass $M_{\rm gas}^{\rm tot} \geq 1.6\times10^6 M_\odot$. Accounting for the gas in neutral and molecular form, we find that the star-formation efficiency lies in the 3–5% range.

This work is discussed more fully in Luridiana & Peimbert (2001).

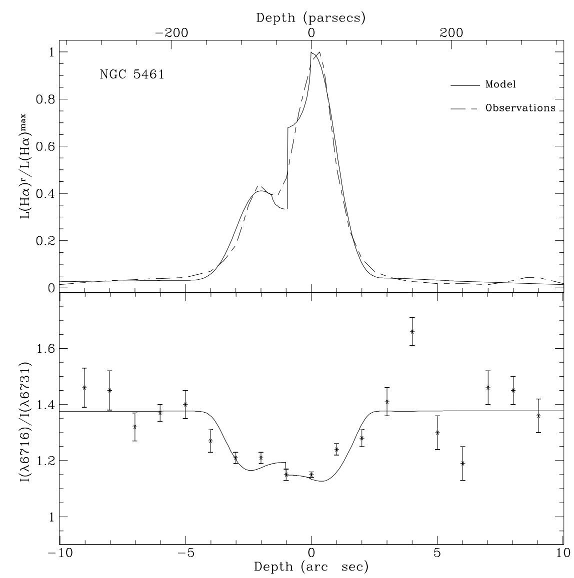


Fig. 2. Upper panel: H$\alpha$ brightness profile of the best-fit model (solid line), compared to the observed profile by Castañeda et al. (1992) (dot-dashed line). Lower panel: $I(\lambda\,6717)/I(\lambda\,6731)$ ratio profile of the best-fit model, superposed to the observational data by Castañeda et al. (1992) (asterisks).

## REFERENCES

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