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Studying the ISM at ~10 pc scale in NGC 7793 with MUSE

II. Constraints on the oxygen abundance and ionising radiation escape *(Corrigendum)*

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Table 3 in the original paper reports inaccurate values of $Q^0_{\rm exp,YSC}$ and $Q^0_{\rm obs}$ (and hence of the related quantities $Q_{\rm exp,tot}$, $Q_{\rm exptot}/Q_{\rm obs}$, and $f_{\rm esc}$). The error in $Q^0_{\rm exp,YSC}$ results from a mistake in the sampling of the cluster probability distribution functions (PDFs), whereas $Q^0_{\rm obs}$ was mistakenly computed from non-dereddened values of $L(\rm H\alpha)$. In Table 1 we provide a revised version of the original Table 3, and in Figs. 1 and 2 we show revised versions of the original Figs. 10 and 11.

The revised values do not change any of the conclusions stated in the original paper. In the following we provide revised text for the affected sections.

7. Ionisation budget

7.4. Resulting budget

We observe that in regions 2, 3, 6, and 7, the value of $f_{\rm esc}$ (with the related uncertainty) reaches unphysical values $f_{\rm esc} < 0$, indicating that either the models are underestimating the photon flux, or the observed luminosity is being overestimated. This is possibly due to the reddening correction or to the exact location of the region boundaries.

Overall, we find $f_{\rm esc,H\,II} = 0.43^{+0.13}_{-0.23}$ for the entire population of H II regions. We observe that the stellar population in the diffuse ionised gas (DIG) produces a more than sufficient amount of ionising photons ($Q(H^0)_{\rm exp} > Q(H^0)_{\rm obs}$), and that the DIG is therefore consistent with being self-ionised, with $f_{\rm esc,DIG} = 0.85^{+0.04}_{-0.07}$. This holds also if considering a maximum mass of 30 $M_\odot$ for field O stars, in which case we find $f_{\rm esc,DIG} = 0.50^{+0.12}_{-0.20}$. Our conclusion therefore remains unchanged: in our field of view (FoV), we observe that the sources of ionising photons produce a photon flux that is more than sufficient to explain the emission of the ionised interstellar medium (ISM), both within and outside the H II regions.

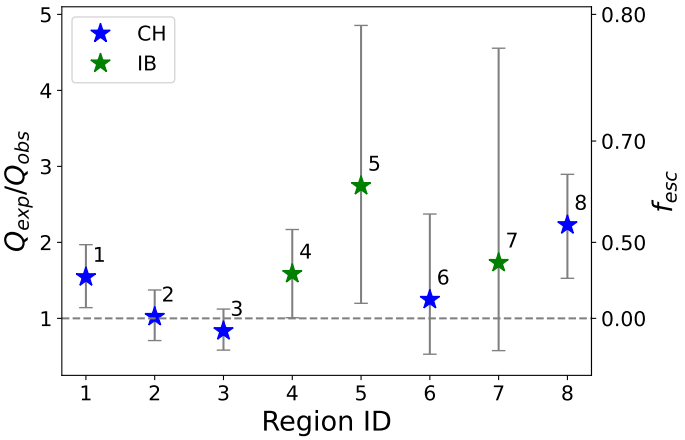

Fig. 1. Revised version of Fig. 10 in the original paper.

7.5. Escape fraction from individual H II regions

Figures 1 and 2 are revised versions of Figs. 10 and 11 in the original paper. Our finding still stands: we do not observe a trend between $f_{\rm esc}$ and the region morphology nor between $f_{\rm esc}$ and the age of the stellar population in the region.

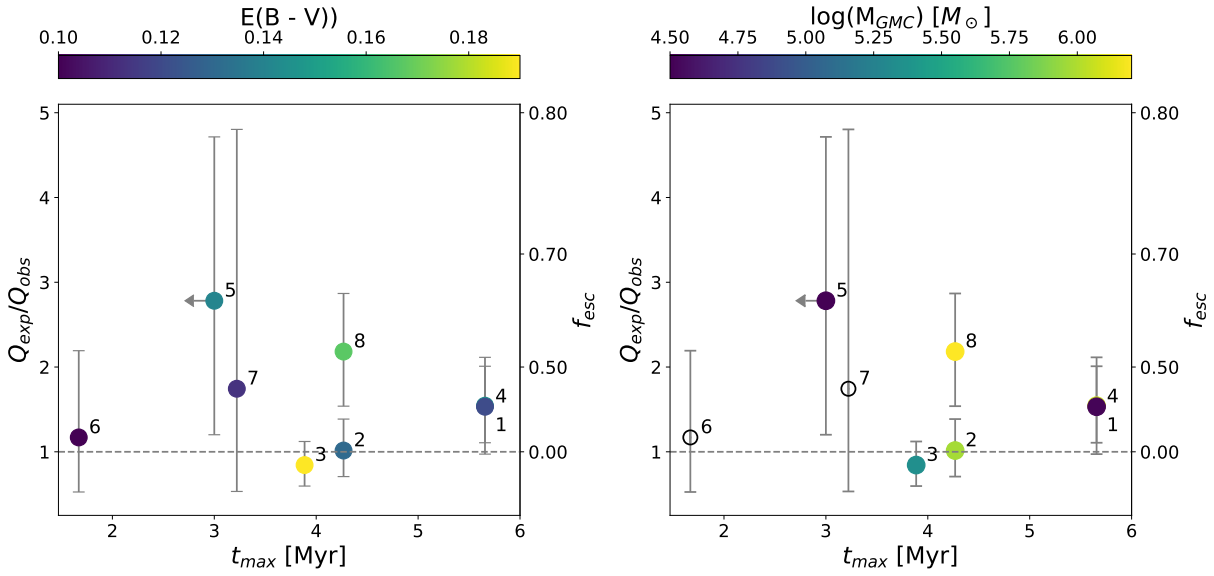

Fig. 2. Revised version of Fig. 11 in the original paper.

Table 1. Revised version of Table 3 in the original paper.

Region ID	$\log Q^0_{\rm exp,Ostars}$ [s^{-1}]	$\log Q^0_{\rm exp,YSC}$ [s^{-1}]	$\log Q^0_{\rm exp,WR}$ [s^{-1}]	$\log Q^0_{\rm exp,tot}$ [s^{-1}]	$\log Q^0_{\rm obs}$ [s^{-1}]	$Q^0_{\rm exp,tot}/Q^0_{\rm obs}$	$f_{\rm esc}$
1	$51.11^{+0.15}_{-0.13}$	$49.94^{+0.76}_{-0.32}$	$50.06^{+0.02}_{-0.02}$	$51.17^{+0.17}_{-0.13}$	51.00	$1.54^{+0.43}_{-0.40}$	$0.35^{+0.14}_{-0.23}$
2	$50.53^{+0.17}_{-0.15}$	$49.06^{+0.18}_{-0.43}$	$49.40^{+0.00}_{-0.09}$	$50.58^{+0.16}_{-0.15}$	50.57	$1.02^{+0.35}_{-0.31}$	$0.02^{+0.25}_{-0.43}$
3	$50.47^{+0.17}_{-0.15}$	$49.38^{+0.51}_{-0.28}$	$49.40^{+0.00}_{-0.09}$	$50.54^{+0.19}_{-0.15}$	50.62	$0.83^{+0.29}_{-0.25}$	$-0.20^{+0.31}_{-0.52}$
4	$50.34^{+0.16}_{-0.16}$	$48.53^{+0.59}_{-0.36}$	–	$50.34^{+0.17}_{-0.16}$	50.15	$1.59^{+0.58}_{-0.58}$	$0.37^{+0.17}_{-0.36}$
5	$49.69^{+0.33}_{-0.24}$	–	–	$49.69^{+0.33}_{-0.24}$	49.25	$2.74^{+2.11}_{-1.55}$	$0.64^{+0.16}_{-0.47}$
6	$49.13^{+0.74}_{-0.36}$	$48.91^{+0.59}_{-0.25}$	–	$49.33^{+0.68}_{-0.32}$	49.30	$1.25^{+1.13}_{-0.72}$	$0.20^{+0.38}_{-1.09}$
7	$49.06^{+0.90}_{-0.34}$	$48.16^{+0.59}_{-0.40}$	–	$49.12^{+0.86}_{-0.35}$	48.91	$1.73^{+2.82}_{-1.16}$	$0.42^{+0.36}_{-1.16}$
8	$51.11^{+0.14}_{-0.14}$	$49.49^{+0.72}_{-0.32}$	$49.40^{+0.00}_{-0.09}$	$51.13^{+0.15}_{-0.15}$	50.78	$2.23^{+0.67}_{-0.70}$	$0.55^{+0.10}_{-0.21}$
Tot H II	$51.67^{+0.14}_{-0.14}$	$50.22^{+0.69}_{-0.32}$	$50.23^{+0.02}_{-0.02}$	$51.70^{+0.15}_{-0.14}$	51.47	$1.74^{+0.51}_{-0.50}$	$0.43^{+0.13}_{-0.23}$
Tot DIG	$51.51^{+0.13}_{-0.14}$	$50.11^{+0.36}_{-0.28}$	$49.39^{+0.01}_{-0.08}$	$51.53^{+0.14}_{-0.15}$	50.72	$6.58^{+2.14}_{-2.08}$	$0.85^{+0.04}_{-0.07}$
Tot $\rm DIG_{lower\ limit}$	$50.93^{+0.13}_{-0.14}$			$51.01^{+0.17}_{-0.16}$		$2.02^{+0.67}_{-0.58}$	$0.50^{+0.12}_{-0.20}$

Notes. The uncertainties on $\log Q^0_{\rm obs}$ are all of the order of ≤0.001.

8. Discussion

Our revised estimate of the fraction of diffuse gas expected is

$$f_{\rm DIG,exp} = \frac{Q^0_{\rm exp,DIG}}{Q^0_{\rm exp,DIG} + Q^0_{\rm exp,H\,II}} \gtrsim 0.15.$$

This is in even closer agreement with Paper I.

The revised $Q(H^0)$ values still point to a DIG consistent with being self-ionised by field stars and clusters, with an overabundance of ionising photons $f_{\rm esc} \sim 0.85^{+0.04}_{-0.07}$; we confirm this trend also when considering our lower-limit estimate. Overall the H II regions are leaking ionising photons at a rate $f_{\rm esc} \sim 0.43^{+0.13}_{-0.23}$, with five out of eight having an $f_{\rm esc} \gtrsim 0.3$. Even when considering the uncertainties, we find $f_{\rm vesc} > 0$ for the DIG overall and for four out of the eight H II regions inspected.

9. Conclusions

Overall, we find an escape fraction $f_{\rm esc} = 0.43^{+0.13}_{-0.23}$ for the population of H II regions, and that the DIG in our FoV is more than consistent with being self-ionised, with an $f_{\rm esc} = 0.85^{+0.04}_{-0.07}$. This holds even when considering a lower-limit estimate for the DIG flux, which was derived by assuming a maximum mass of 30 $M_\odot$ for the field O stars. We furthermore find that the $f_{\rm DIG,exp} \gtrsim 0.15$ obtained by modelling the DIG stellar population is in good agreement with the DIG fraction derived from the observed Hα luminosity in Paper I, $f_{\rm DIG,obs} = 0.15$. Finally, we observe an $f_{\rm esc} \gtrsim 0.3$ in five out of the eight studied regions.