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# A highly ionized stellar bow shock in the Small Magellanic Cloud

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Abstract

We report the discovery of a parsec-scale stellar bow shock associated with the O2 III(f) star Walborn 3 in the cluster NGC 346 of the Small Magellanic Cloud. Emission line images of He II and [Ar IV], etc.

*Keywords:* Atomic physics; Radiative transfer; Photodissociation regions

1. INTRODUCTION
2. OBSERVATIONS
3. RESULTS
4. CONCLUSIONS

1 Thank you.

*Facilities:* VLT:Yepun (MUSE)

REFERENCES

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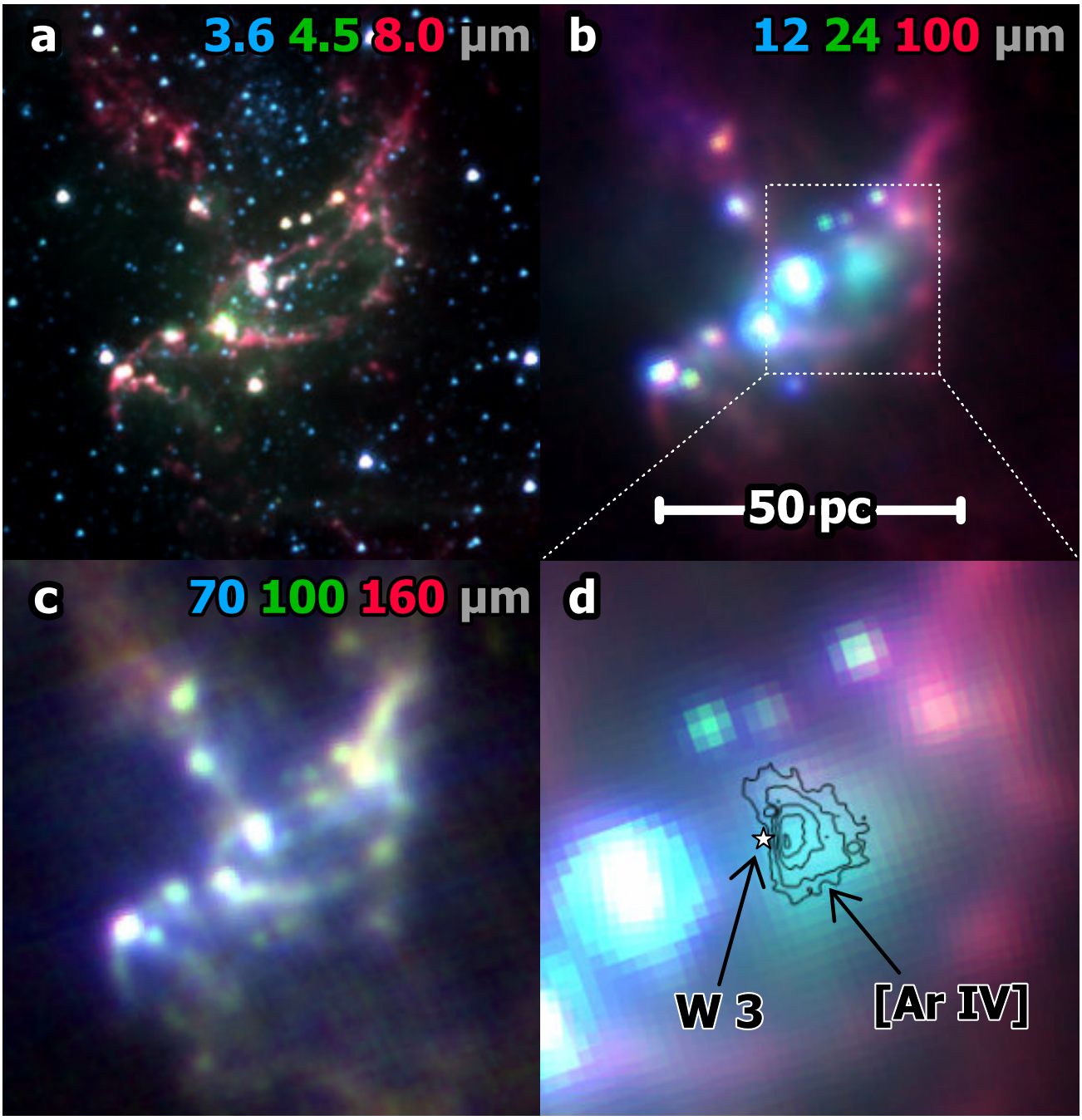


**Figure 1.** Panoramic view of the NGC 346/N66 region at infrared wavelengths: (a) Short wavelength mid-infrared (3.6 to 8 μm); (b) Longer wavelength mid-infrared (12 to 100 μm); (c) Far-infrared (70 to 150 μm); (d) Zoomed view of panel c. Images are from satellite observatories as follows: *Spitzer* IRAC 3.6, 4.5, 8 μm); *WISE* 12 μm; *Spitzer* MIPS 24, 70 μm; *Herschel* PACS 100, 150 μm.

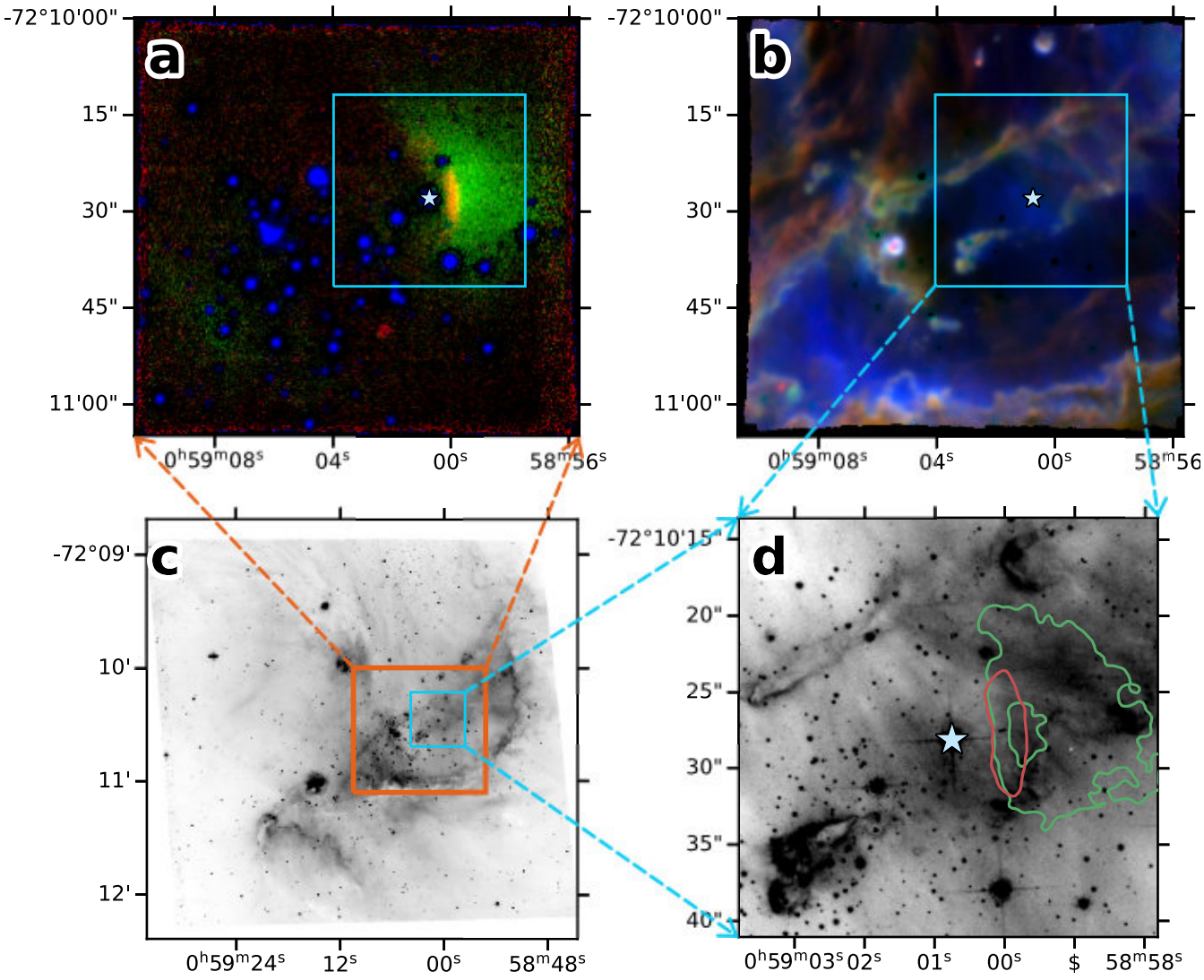


**Figure 2.** MUSE emission line images of the cort of NGC 346. (a) High-ionization emission from the bow shock. (b) Medium to low-ionization emission from the surrounding H II region. (c) Location of the MUSE field within the wider nebula. (d) Zoom on the bow shock region in the light of H$\alpha$ emission,

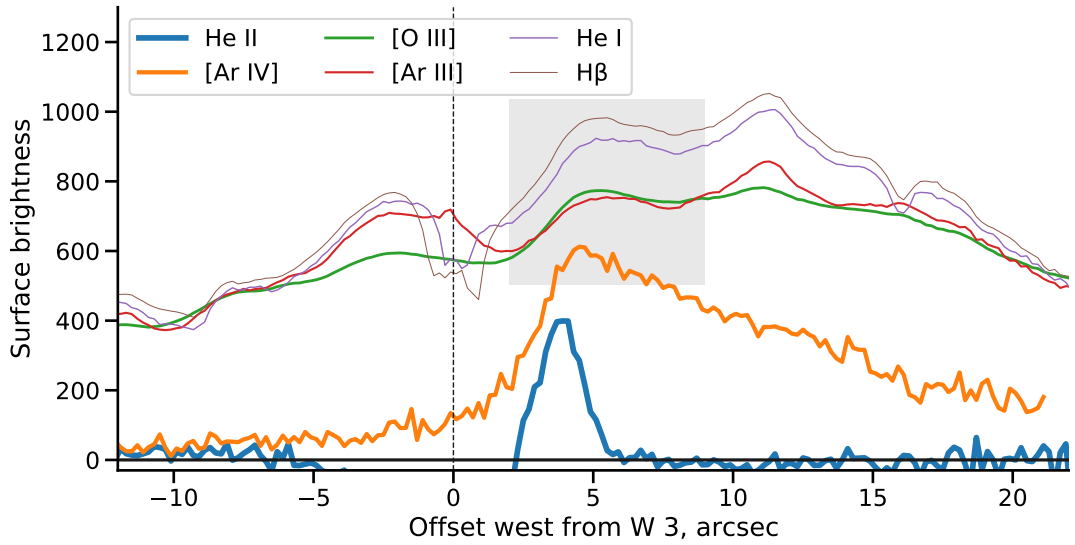


**Figure 3.** Emission line surface brightness profiles along an East–West cut across the bow shock, derived from MUSE integral field spectra.

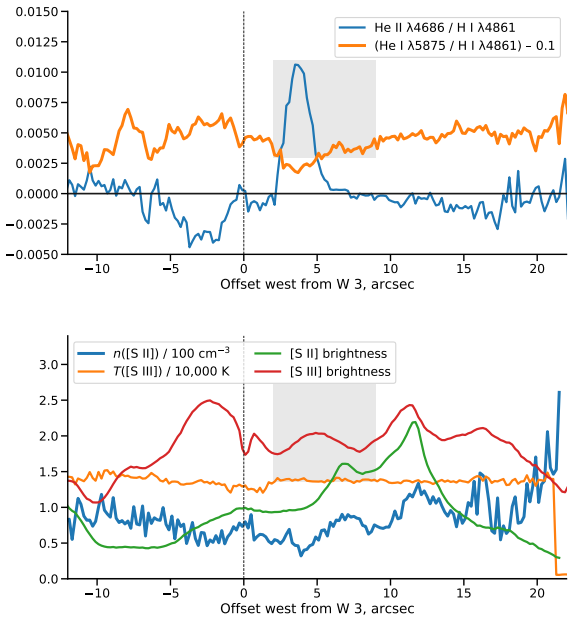


**Figure 4.** More profiles

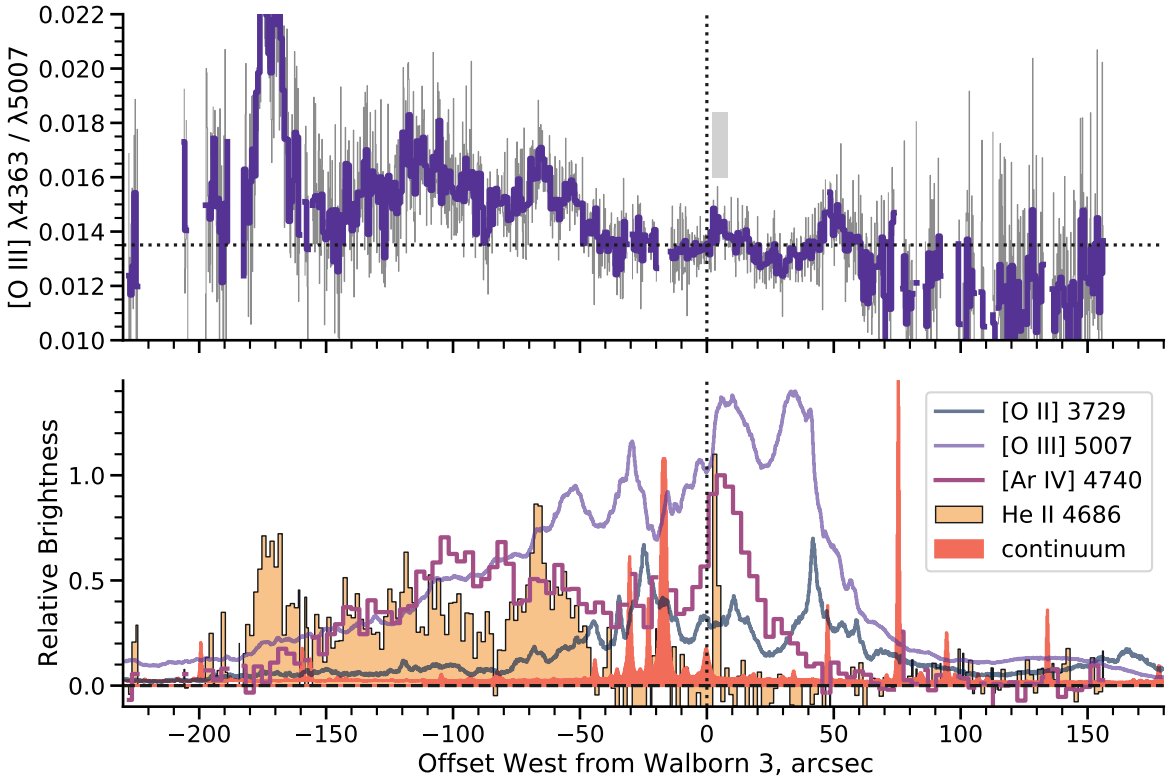


**Figure 5.** Emission line surface brightness profiles and line ratios along a large-scale East–West cut across the entire region, based on FORS1 longslit spectra. The slit is close to the symmetry axis of the bow shock. (a) Temperature-sensitive line ratio [O III] 4363/5007. The gray box shows the same inner rim region of the bow shock that is highlighted by a gray box in Fig. 3. (b) Selected emission lines from a wide range of ionization stages.

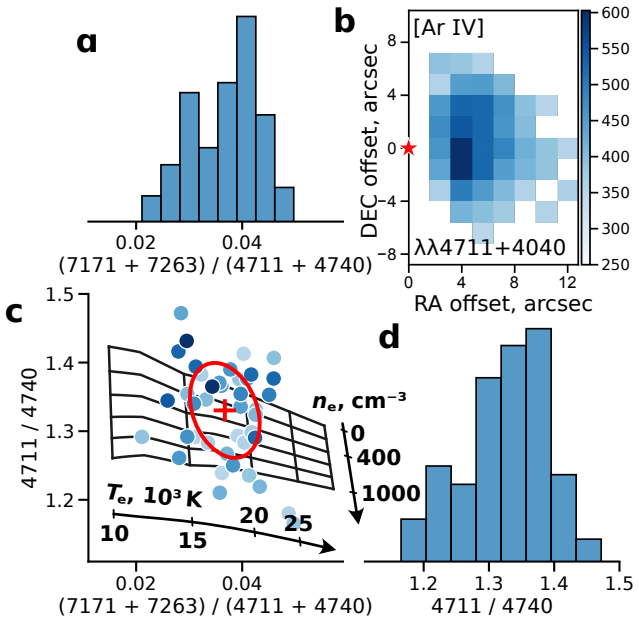


**Figure 6.** Temperature and density diagnostics of the bow shock from [Ar IV] line ratios.

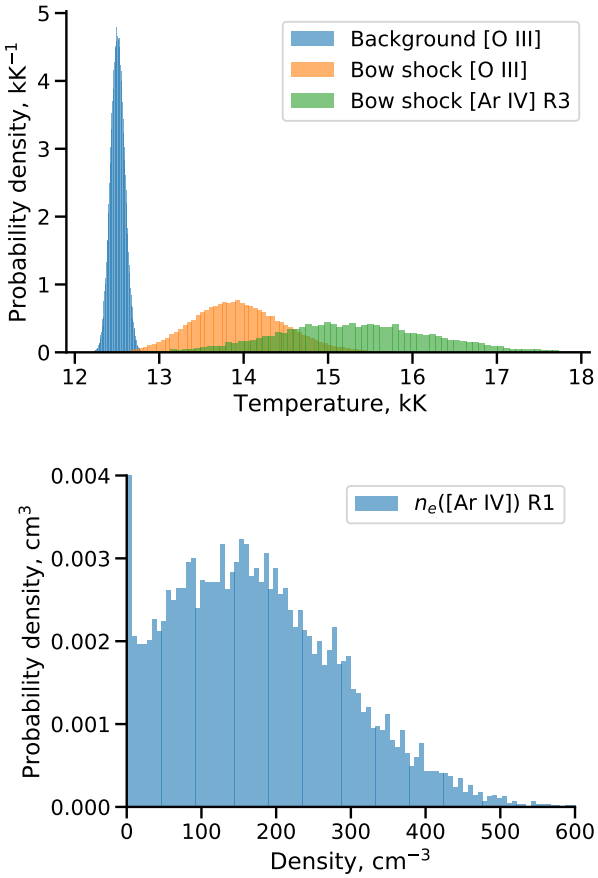


**Figure 7.** Derived temperature of nebula and bow shock.