

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

4. CONCLUSIONS

2. OBSERVATIONS

3. RESULTS

¹ Thank you.

Facilities: VLT:Yepun (MUSE)

REFERENCES

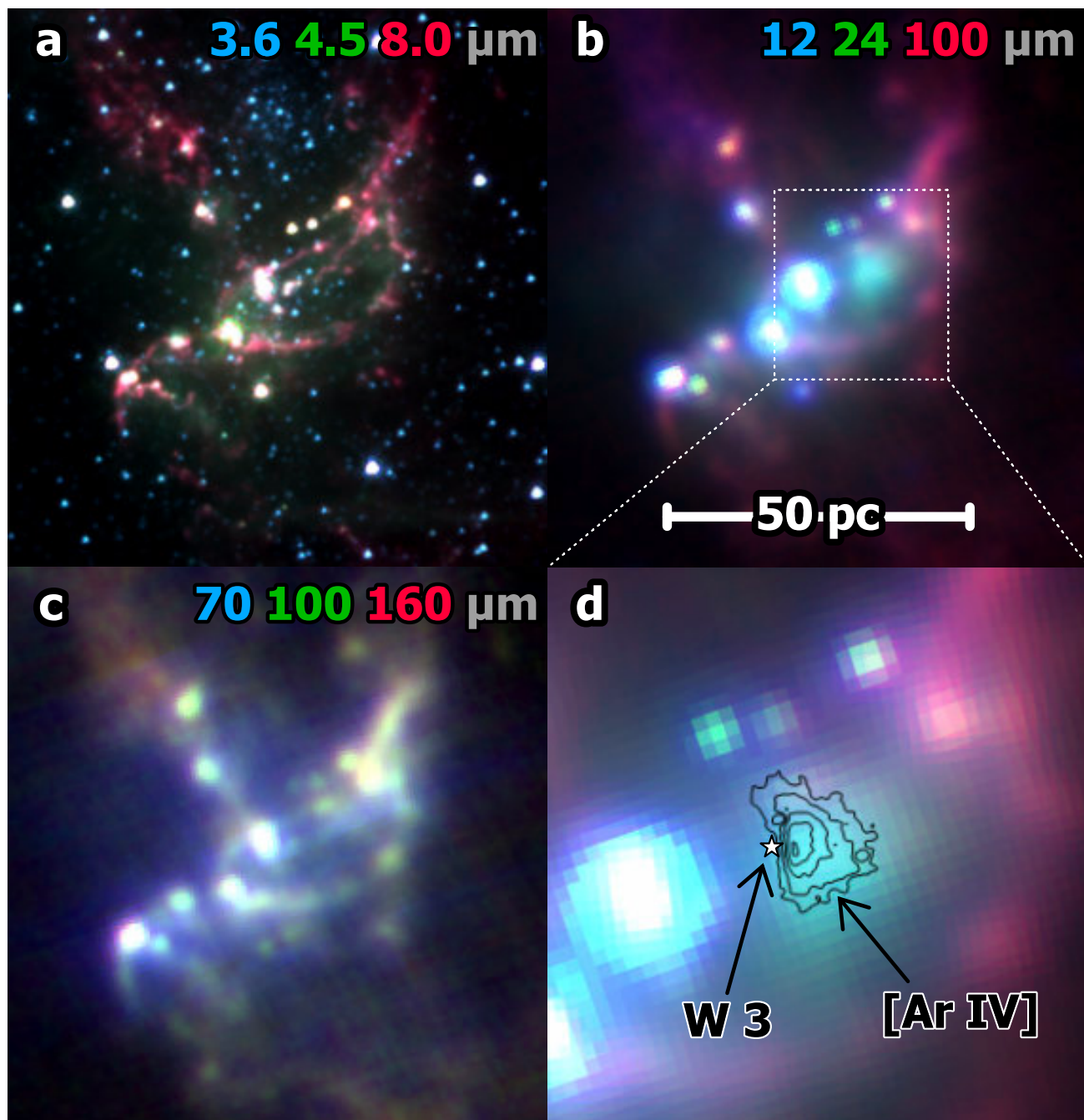


Figure 1. Panoramic view of the NGC 346/N66 region at infrared wavelengths: (a) Short wavelength mid-infrared (3.6 to 8 μm); (b) Longer wavelength mid-infrared (12 to 100 μm); (c) Far-infrared (70 to 150 μm); (d) Zoomed view of panel c. Images are from satellite observatories as follows: *Spitzer* IRAC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

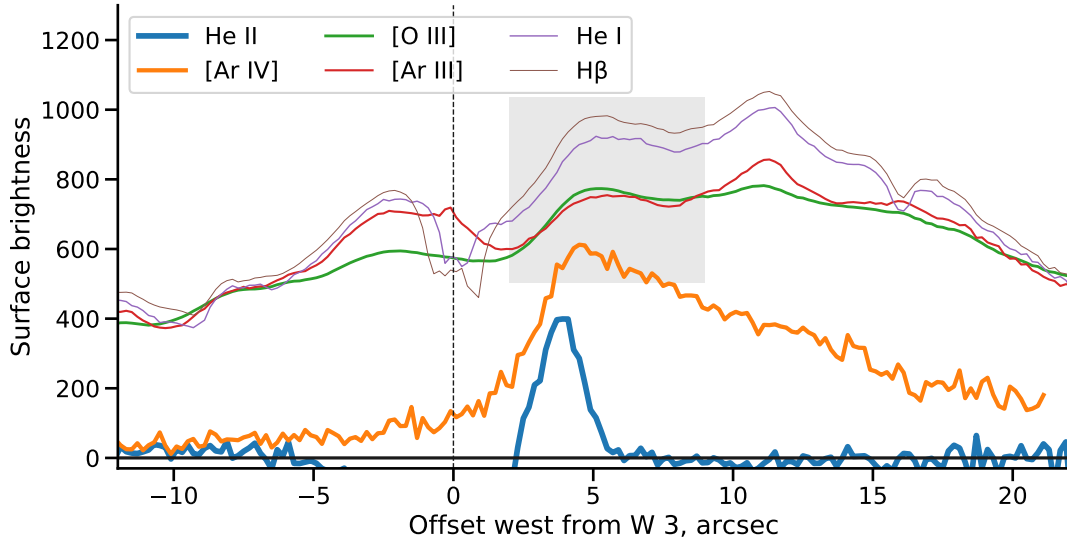


Figure 2. Emission line surface brightness profiles along an East–West cut across the bow shock, derived from MUSE integral field spectra.

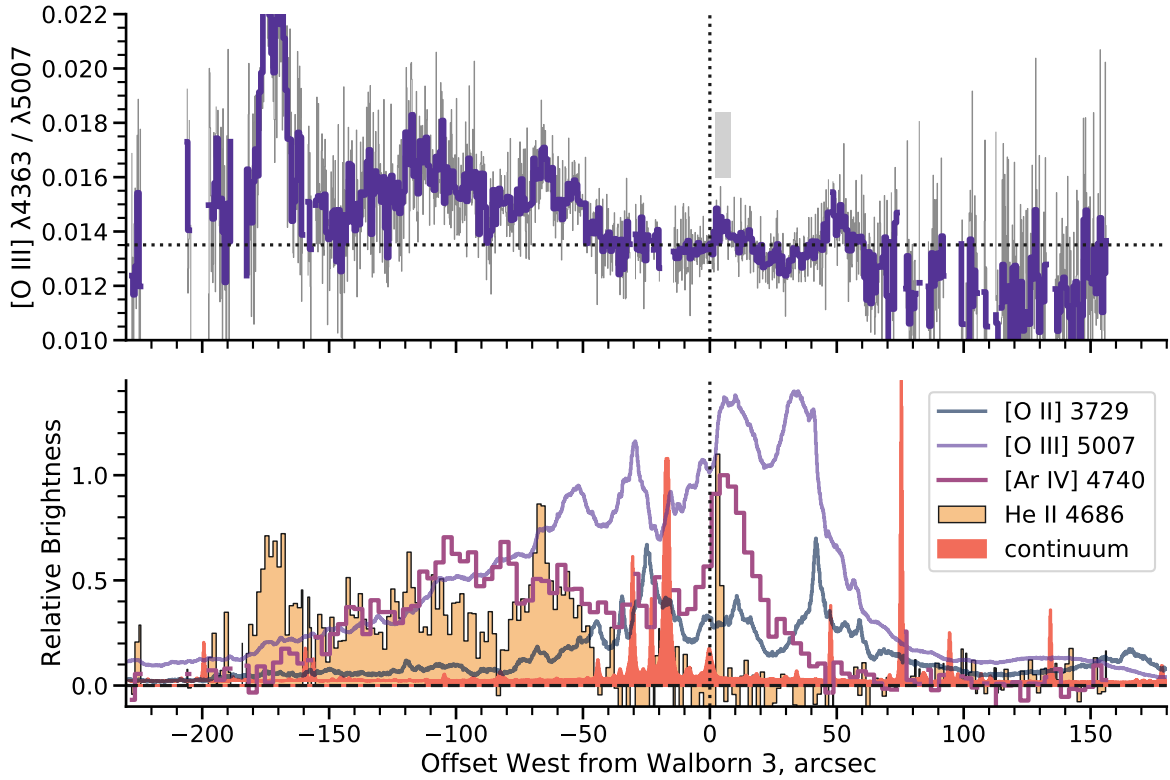


Figure 3. Emission line surface brightness profiles and line ratios along a large-scale East–West cut across the entire region, based on FORS1 longslit spectra. The slit is close to the symmetry axis of the bow shock. (a) Temperature-sensitive line ratio $[\text{O III}] \lambda 4363 / \lambda 5007$. The gray box shows the same inner rim region of the bow shock that is highlighted by a gray box in Fig. 2. (b) Selected emission lines from a wide range of ionization stages.

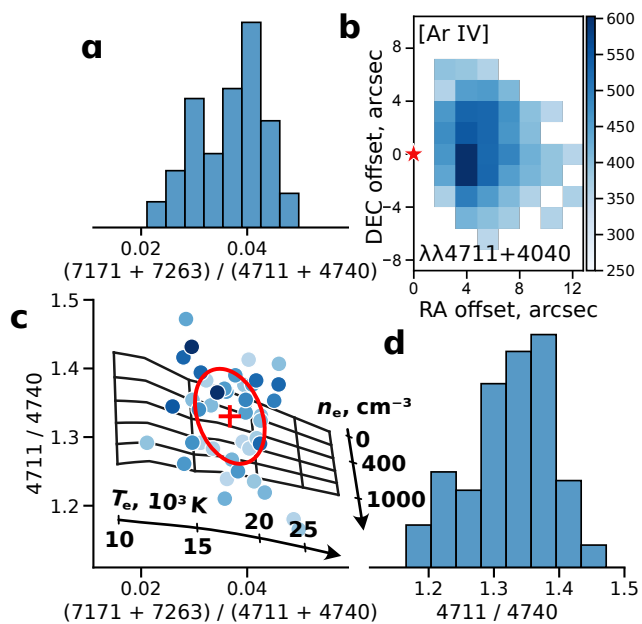


Figure 4. Temperature and density diagnostics of the bow shock from [Ar IV] line ratios.

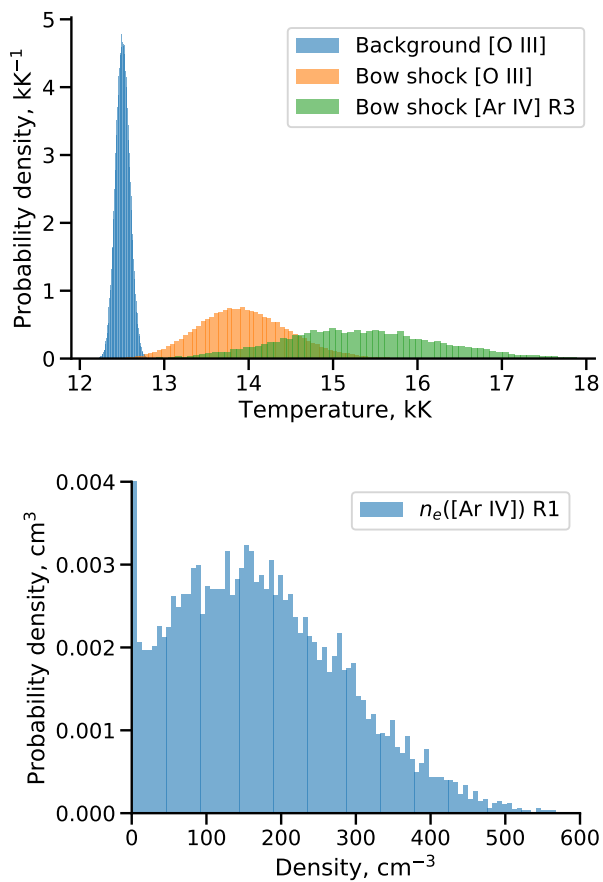


Figure 5. Derived temperature of nebula and bow shock.