Spectroscopic analysis tool for intEgraL fieLd unIt daTacubEs (SATELLITE): The case of SNR 0509-68.7

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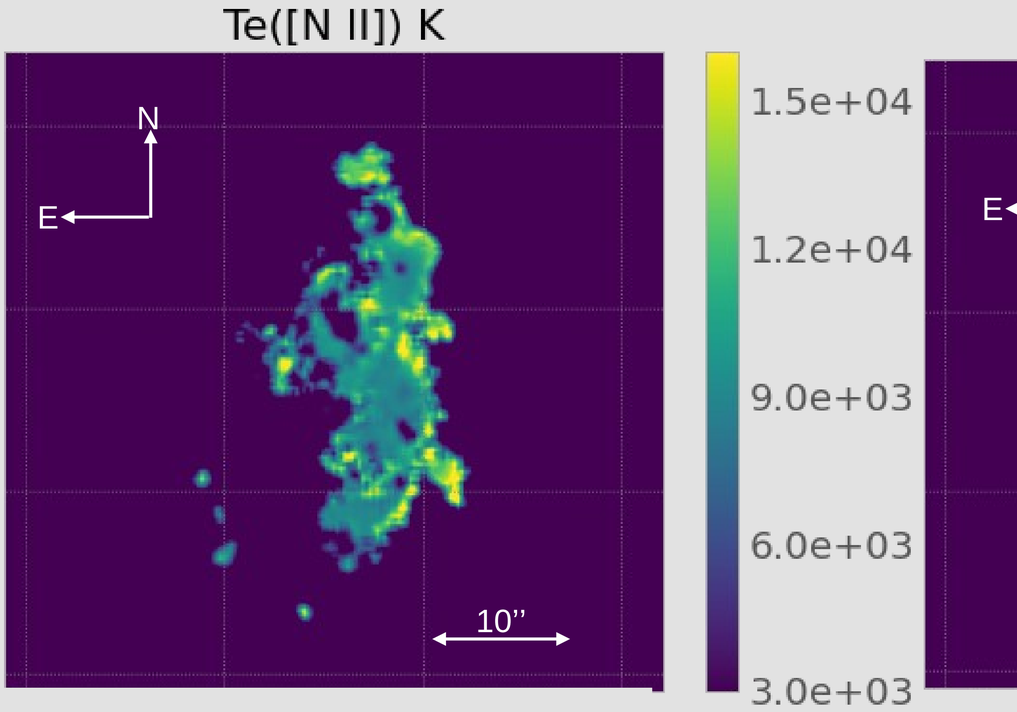
ABSTRACT

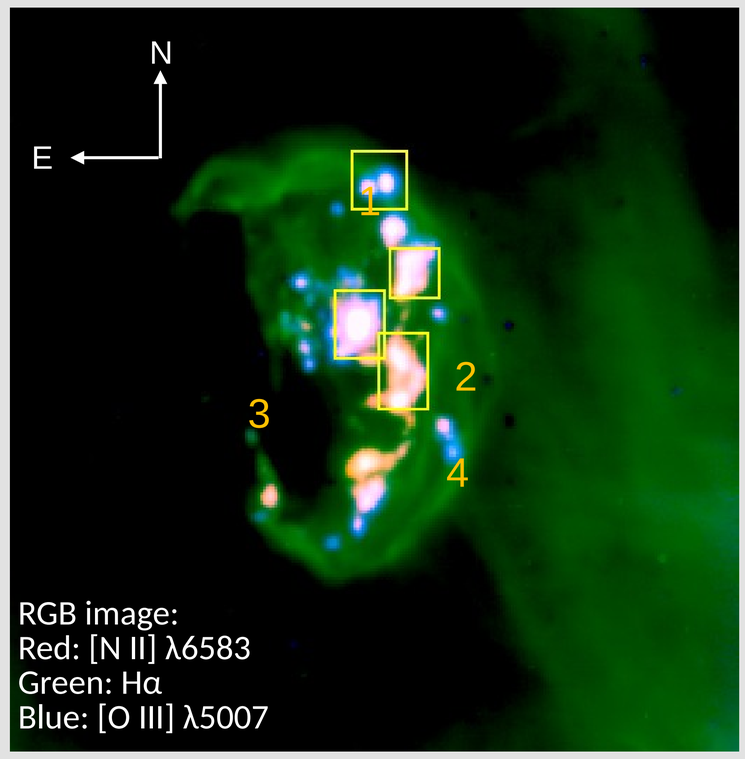
Spectroscopic analysis tool for intEgraL fieLd unIt daTacubEs (SATELLITE; Akras et al. 2022) in conjuction with MUSE@VLT data (PI: Seitenzahl, programme ID:0104.D-0104(A)) are employed for the characterization of the SNR 0509-68.7. SATELLITE has already been applied succesfully to PNe (Akras et al., 2022, Bouvis et al., in prep, Konstantinou et al., in prep) with MUSE data and here we present the preliminary results of employing SATELLITE code for the first time on a SNR.

SATELLITE

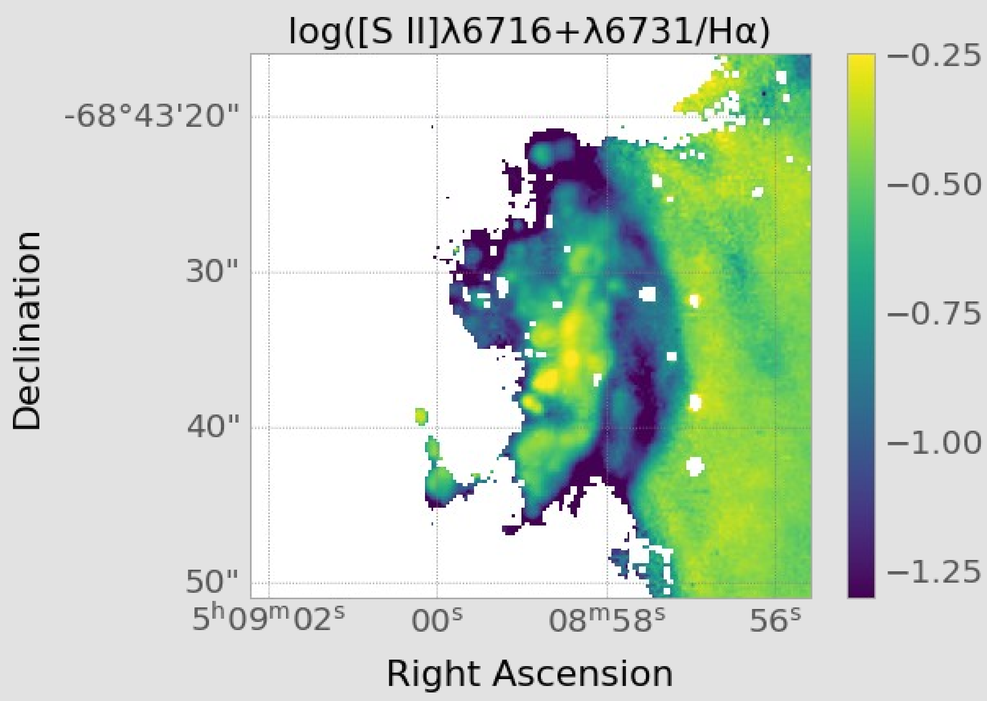
SATELLITE code performs spectroscopic analysis on Integral Field Unit (IFU) data and it can be used for the characterization of extended nebulae like Planetary nebulae (PNe), Supernova Remnants (SNRs), galaxies and H II regions.The PYNEB python package (Luridiana et al. 2015) is employed for the determination of the physico-chemical properties of the ionized nebulae. SATELLITE performs an 1D spectroscopic analysis for the direct comparison of the IFU observations with previous studies based on long-slit spectroscopy, and a 2D spectroscopic analysis for the investigation of physico-chemical properties in both spatial directions.

PRELIMINARY RESULTS





Some of the clumps seem to be more prominent in [N II], while others are brighter in higher ionization species



At the outer SNR structures log([S II]/Hα)<-0.4 (the lower limit for shock excitation) propably due to the strong contribution of the surrounding nebula

	slit 1	slit 2	slit 3	slit 4
	T_e(K)/N_e (cm^{-3})			
T_e[N II]	14 883±327	10 095±274	9 707± 104	9 178±563
N_e[S II]	18 264±2 488	16 015±1 287	33 724±1 749	13 895±9 902
	Emission line ratios			
c(Hβ)	0.53±0.02	0.46±0.01	0.46±0.01	0.48±0.02
log ([O I]/ [O III])	0.07±0.01	-0.51±0.01	-0.10±0.01	-0.72±0.01
log ([N II]/ Hα)	-0.89±0.03	-0.60±0.02	-0.63±0.02	-0.57±0.02
log ([S II]/ Hα)	-1.04±0.03	-0.62±0.02	-0.68±0.02	-0.38±0.02

Four pseudo-slits were placed as shown in the RGB image to study the properties of the clumps via SATELLITE's module 'specific slit analysis task'

References

Akras S., et al., 2022, MNRAS, 512, 2202A
Luridiana V., Morisset C., Shaw R. A., 2015, A&A, 573A, 42L

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