

VLT/NACO near-infrared imaging and spectroscopy of N88A in the SMC

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We present near-infrared imaging and spectroscopic high spatial resolution observations of the SMC region N88 containing the bright, excited, extincted and compact H II region N88A of size ~ 1 pc. To investigate its stellar content and reddening, N88 was observed using spectroscopy and imagery in the JHKs- and L'-band at a spatial resolution of ~ 0.1 - $0.3''$, using the VLT UT4 equipped with the NAOS adaptive optics system. In order to attempt to establish if the origin of the infra-red (IR) excess is due to bright nebulosity, circumstellar material and/or local dust, we used Ks vs J-K colour-magnitude (CM) and JHK colour-colour (CC) diagrams, as well as L' imagery. Our IR-data reveal in the N88 area an IR-excess fraction of ≥ 30 per cent of the detected stars, as well as an unprecedentedly detailed morphology of N88A. It consists of an embedded cluster of $\sim 3.5''$ (~ 1 pc) in diameter, of at least thirteen resolved stars superposed with an unusual bright continuum centered on a very bright star. The four brightest stars in this cluster lie red-ward of H-K ≥ 0.45 mag, and could be classified as young stellar object (YSO) candidates. Four other probable YSO candidates are also detected in N88 along a south-north bow-shaped thin H₂ filament at $\sim 7''$ east of the young central bright star. At $0.2''$ east of this star, a heavily embedded core is detected in the L'-band that could be a massive class I protostar candidate. The $2.12 \mu\text{m}$ H₂ image of N88A resembles a shell of diameter $\sim 3''$ (~ 0.9 pc) centered on the bright star. The line ratios of H₂ 2-1 S(1) and 1-0 S(0) relative to 1-0 S(1), as well as the presence of high ν lines, are indicative of photodissociation regions, rather than shocks.

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Comments:

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