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THE DUSTY SIDE OF NGC 3603: TIMMI 2 DATA REVEAL A STRIKING DIVERSITY OF MID-IR SOURCES

D. E. A. Nürnberger[1] and Th. Stanke[2]

We give an overview of results obtained in the framework of our sub-arcsec resolution 11.9 μm and 18 μm imaging survey of the southern hemisphere giant H II region NGC 3603 (Nürnberger & Stanke 2003). The fields observed with TIMMI 2 at the ESO 3.6 m telescope comprise the vicinity of the OB cluster, covering dense molecular cloud cores, embedded near-IR sources and maser sources. Surprisingly, we detect mid-IR emission from a large variety of sources.

In the area surveyed—a small part is shown in Figure 1—the protostar IRS 9A is found to be the most luminous point source at both 11.9 μm and 18 μm. Located in its immediate vicinity two more sources (IRS 9B and IRS 9C) also exhibit significant 11.9 μm and 18 μm emission, thus providing further indications for IRS 9 being an association of protostars in its own right. Several other 11.9 μm point sources are related to near-IR sources with strong K-band excess emission and/or to maser sources, which classifies them as young sources, too. In contrast, the second strongest 11.9 μm source, IRS 4, appears to be in a more evolved stage.

Towards the center of the OB cluster we also observe mid-IR emission arising from the three Wolf-Rayet stars WR 43abc, providing evidence for dust production and/or the presence of plasma in their circumstellar envelopes. Spread all over the cluster, we detect a number of sources with mid-IR fluxes close to the sensitivity limit ($\sim$ 0.01 Jy) of our 11.9 μm data, which apparently have very red $K-N$ colors. We suggest that these sources are circumstellar disks which are externally heated by the nearby massive stars.

Towards the south and west of the OB cluster, large amounts of diffuse emission are found closely correlated with ionized material. We identify at least 7 shocks and ionization fronts, reflecting the enormous impact of the fast stellar winds and ionizing photons, originating from the massive cluster stars, on the adjacent gas and dust. This is impressively emphasized by the shocked and ionized material associated with the heads of the two prominent pillars. Both pillars are easily seen in our 11.9 μm and 18 μm data: the western one in emission, the eastern one in absorption against a strong diffuse mid-IR background.

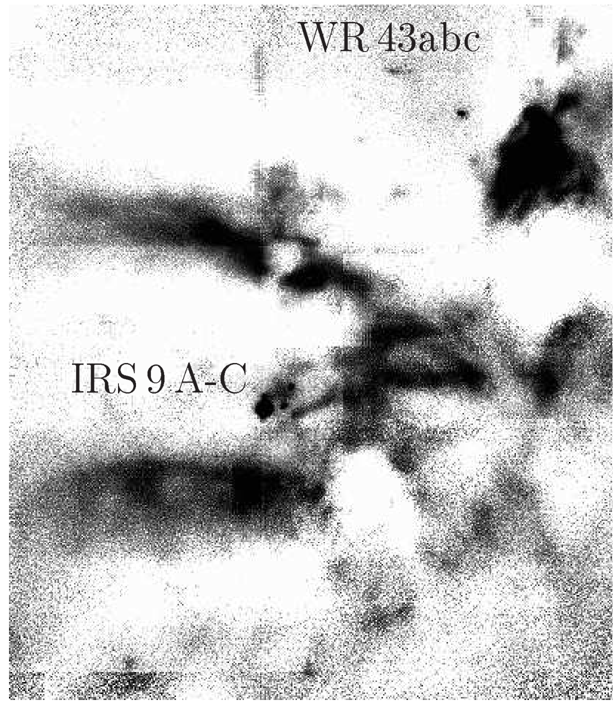

Fig. 1. Central part (FOV = $2'\!.0 \times 2'\!.3$) of our 11.9 μm NGC 3603 data.

Among those sources, for which our data do not reveal any point-like mid-IR counterpart, are IRS 1 as well as the three "proplyds". However, at least for "proplyd" 3 we detect extended, rim-like 11.9 μm emission. Therefore, we consider it likely that NGC 3603's "proplyds" simply represent scaled-down versions of the neighbouring pillars, i.e., remnant density enhancements of the pristine molecular cloud which to date were able to resist the ionizing and photoevaporating radiation from the nearby OB stars.

[1]European Southern Observatory, Casilla 19001, Santiago 19, Chile (dnuernbe@eso.org).
[2]Max-Planck-Institut für Radioastronomie, Auf dem Hügel 69, 53121 Bonn, Germany (tstanke@mpifr-bonn.mpg.de).

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