Acknowledgements

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Peter Quinn provided the original version of Figure 1.

Hunting the Southern Skies with SIMBA

(Taken from ESO Press Release 20/01 – 30 August 2001)

A new instrument, SIMBA ("SEST IMaging Bolometer Array"), was installed at the Swedish-ESO Submillimetre Telescope (SEST) at the ESO La Silla Observatory in July 2001. In order to achieve the best possible sensitivity, SIMBA is cooled to only 0.3 deg above the absolute zero on the temperature scale.

The SIMBA ("Lion" in Swahili) instrument detects radiation at a wavelength of 1.2 mm. It has 37 "horns" and acts like a camera with 37 picture elements (pixels). By changing the pointing direction of the telescope, relatively large sky fields can be imaged.

SIMBA was built and installed at the SEST within an international collaboration between the University of Bochum and the Max Planck Institute for Radio Astronomy in Germany, the Swedish National Facility for Radio Astronomy and ESO.

SIMBA is the first imaging millimetre instrument in the southern hemisphere. Radiation at this wavelength is mostly emitted from cold dust and ionised gas in a variety of objects in the Universe. Among others, SIMBA now opens exciting prospects for in-depth studies of the "hidden" sites of star formation, deep inside dense interstellar nebulae. While such clouds are impenetrable to optical light, they are transparent to millimetre radiation and SIMBA can therefore observe the associated phenomena, in particular the dust around nascent stars.

This sophisticated instrument can also search for disks of cold dust around nearby stars in which planets are being formed or which may be left-overs of this basic process. Equally important, SIMBA may observe extremely distant galaxies in the early universe, recording them while they were still in the formation stage.

During the first observations, SIMBA was used to study the gas and dust content of star-forming regions in our own Milky Way Galaxy, as well as in the Magellanic Clouds and more distant galaxies. It was also used to record emission from planetary nebulae, clouds of matter ejected by dying stars. Moreover, attempts were made to detect distant galaxies and quasars radiating at mm-wavelengths and located in two well-studied sky fields, the "Hubble Deep Field South" and the "Chandra Deep Field" .

Various SIMBA images have been obtained during the first tests of the new instrument. The first observations confirm the great promise for unique astronomical studies of the southern sky in the millimetre wavelength region.

These results also pave the way towards the Atacama Large Millimetre Array (ALMA), the giant, joint research project that is now under study in Europe, the USA and Japan.

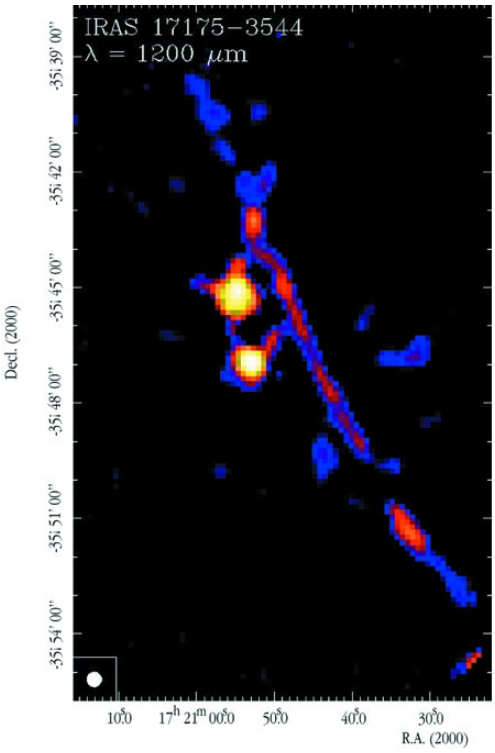

Figure 1: This intensity-coded, false-colour SIMBA image is centred on the infrared source IRAS 17175-3544 and covers the well-known high-mass star formation complex NGC 6334, at a distance of 5500 light-years. The southern bright source is an ultra-compact region of ionised hydrogen ("HII region") created by a star or several stars already formed. The northern bright source has not yet developed an HII region and may be a star or a cluster of stars that are presently forming. A remarkable, narrow, linear dust filament extends over the image; it was known to exist before, but the SIMBA image now shows it to a much larger extent and much more clearly.

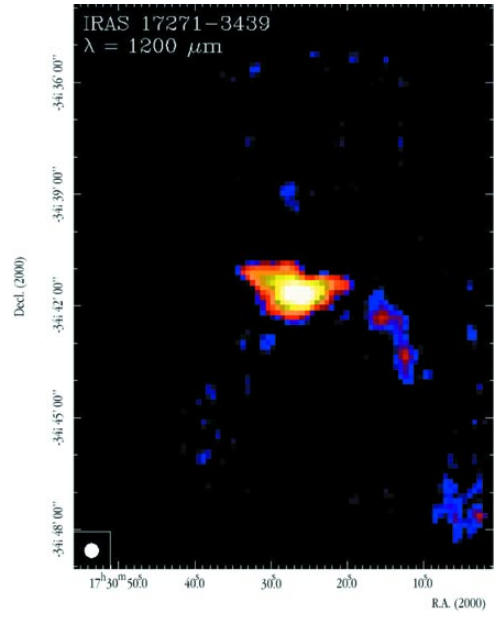

Figure 2: This SIMBA image is centred on IRAS 17271-3439 and includes an extended bright source that is associated with several compact HII regions as well as a cluster of weaker sources.