Bull. Astr. Soc. India (2002) 30, 827–828

First light observations with TIFR near-infrared camera

D.K. Ojha[1], S.K. Ghosh[1], R.P. Verma[1], A. Chakraborti[1,2] and B.G. Anandarao[3]
[1] *Tata Institute of Fundamental Research, Mumbai - 400 005, India*
[2] *Presently at Penn State University, USA.*
[3] *Physical Research Laboratory, Ahmedabad - 380 009, India*

Abstract. The TIFR near-infrared camera (TIRCAM) is based on the SBRC InSb focal plane array (58×62 pixels) sensitive between 1–5 μm. TIRCAM had its first engineering run at Gurusikhar 1.2 meter PRL telescope at Mount Abu during March-April 2001. The first light observations with TIRCAM were quite successful. Several infrared standard stars and the Trapezium Cluster in Orion region were observed in the J, H and K bands. In a narrow band at 3.9 μm (nbL), some bright stars could be detected from the Gurusikhar site. The performance of TIRCAM is discussed in the light of preliminary observations in nbL band.

TIRCAM based on the Santa Barbara Research Corporation (SBRC) **InSb** Focal Plane Array (FPA) (58×62 pixels) sensitive between 1–5 μm has been developed for studying Galactic Star Forming Regions (GSFRs). TIRCAM uses a closed cycle helium cryo-cooler to operate the FPA at 35 K. The temperature is maintained by a heater inside the NIR dewar and controlled by a LAKESHORE temperature indicator/controller unit. In front of the FPA is a 8 position filter wheel with J, H, K, narrow-band L (nbL) & M filters. The filter wheel is motorized and is controlled from the PC in the control room. In front of the filter wheel there are 3 selectable lens systems, with f/13, f/10 and f/6 lenses, respectively. The detector electronics consists of two packages : a computer and a dewar interface. These two electronics packages are connected by three 14 feet long cables. They control the detector for clocking and biasing. The data acquisition system (12 bit fast digitization) includes a PC input/output add-on card and a digitization box near the dewar. The scientific grade focal plane array (FPA #222) characteristics are shown in Table 1.

Observations were performed during the bright sky (near full moon period) in March-

Table 1. Characteristics of the scientific grade focal plane array (FPA # 222)

Pixel Size	Physical Array Chip size	Optical Array Area	Read[1] Noise	Q.E.	Dark Current	DRO gain
76×76 μm^2	24×24 mm^2	4.65×4.34 mm^2	403 e^-	90.3% [2] 80% in K band [4]	0.297 fA [3] 0.427 fA [4]	0.67 [4]

[1]measured at SBRC; [2]@ 2.85 μm, 400K Black Body (measured at SBRC); [3]@35 K (measured at SBRC); [4]measured at TIFR.

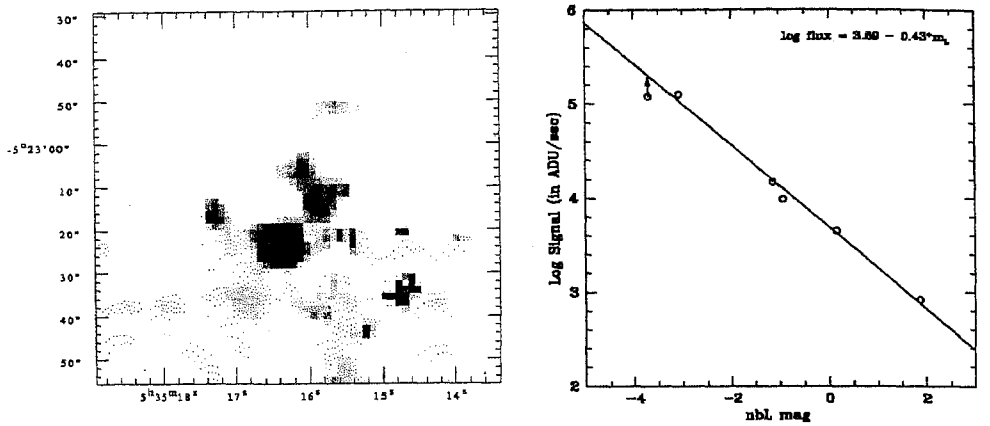

Figure 1. *(Left)* TIRCAM K band image of the Trapezium Cluster in Orion region. Total integration time is 8.32 secs. *(Right)* Plot of the measured signal (ADU/sec) *versus* the standard nbL magnitudes of infrared standards observed with TIRCAM.

April 2001, using TIRCAM system at the f/13 Cassegrain focus of the 1.2 meter telescope of Gurusikhar Observatory of PRL, Ahmebabad (India). We had observed several bright infrared standards (viz. BS 5340, BS 6406, BS 2990, BS 4069, BS 6603 & BS 6136), the Trapezium cluster in Orion region and a Herbig Be star (IRAS 18250-0351, MWC 297) in J, H, K and nbL bands during the engineering run. The plate scale was 1.45"/pixel. In a narrow band at 3.9 μm (nbL), some bright stars with TIRCAM could be detected from the Gurusikhar site. The typical seeing was 2–2.5" during the observations. Fig. 1 shows the K band image (left one) from TIRCAM of the Trapezium Cluster in Orion region. In the same figure (right one), a calibration curve in the nbL band is shown by using the bright infrared standards, which demonstrates the linearity between the measured signal and nbL magnitude (m_L).

The engineering run of TIRCAM at Mount Abu was quite successful. Although the TIRCAM observations were made during the bright sky (near full moon period), we could observe the sources in the nbL band ($\sim$ 3.9 μm) from the Gurusikhar site. We plan to explore TIRCAM's performance in the L (3.5 μm) and M (4.5 μm) bands from Gurusikhar and Hanle sites.