

## Infrared and Radio Observations Towards the Ultracompact HII Region IRAS 19111+1048

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**Abstract.** The ultracompact HII region IRAS 19111+1048 (G45.12 + 0.13) has been studied at mid & far infrared bands and at radio wavelengths. The far infrared maps of this region have been obtained using TIFR 1 metre telescope at 130 & 200  $\mu\text{m}$ . The ionized gas component has been studied in the radio region using GMRT at 1280 and 610 MHz. Maps at both these frequencies for IRAS 19111+1048 show a strong compact source near the infrared peak and a weaker but extended diffuse emission due north-west. The mid-infrared images from Midcourse Space Experiment are used to quantify the distribution of hotter dust and carriers of Unidentified Infrared Bands.

### 1. Observations

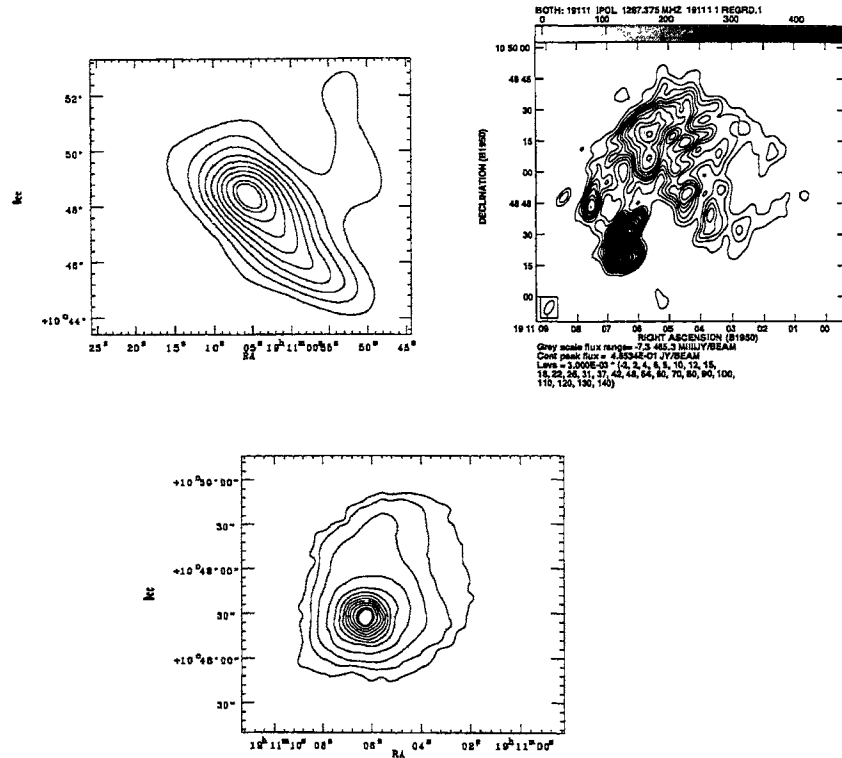
The ultracompact HII (UCHII) region IRAS 19111+1048 is a site of massive star formation. This is one of the few examples where molecular outflows (Hunter et al, 1997) have been detected from young massive objects since most known molecular outflows have been observed in low-mass star formation regions. The Galactic star forming region IRAS 19111+1048 has been observed using the two-band far-infrared (FIR) photometer system at the Cassegrain focus of the TIFR 100 cm (f/8) balloon borne telescope. The observations were carried out during the balloon flight from the TIFR Balloon Facility, Hyderabad on March 08, 1998. Radio observations at 1280 and 610 MHz towards IRAS 19111+1048 were carried out using the Giant Metrewave Radio Telescope (GMRT). The flux calibrators and phase calibrator used during observations were 3C 286 & 3C 48, and 2011-067, respectively. In addition, the spatial distribution of emission in Unidentified Infrared Bands (UIBs) has also been computed for this source using the technique of Ghosh & Ojha (2002) from Midcourse Space Experiment (MSX) data (Price et al, 2001).

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## 2. Results

The observed sky chopped far infrared signals have been deconvolved using an indigenously developed procedure (Ghosh et al, 1988) based on MEM. The deconvolved map of IRAS 19111+1048 at  $200\ \mu\text{m}$ , is presented in Fig. 1 (left). The prominent peak is due to IRAS 19111+1048 and the extension corresponds to the other Galactic star forming region IRAS 19110+1045. The radio continuum emission maps of the region around IRAS 19111+1048 have been obtained for both frequencies, at 1280 and 610 MHz, using AIPS. However, only the 1280 MHz map is presented in Fig. 1 (middle). The uniformly weighted image has a synthesized beam of  $7.5'' \times 3.8''$  and the rms noise is  $\approx 0.7\ \text{mJy/beam}$ . For IRAS 19111+1048, at both frequencies, we can see a strong compact source at the location of the UCHII region with a weaker but diffuse extended emission due north-west.



**Figure 1.** The intensity map for the region around IRAS 19111+1048 in (left)  $200\ \mu\text{m}$ , (middle) 1280 MHz and (right) Unidentified Infrared Bands (1950 coordinates). (Left) Contour levels are at 10, 20, 30, 40, 50, 60, 70, 80, 90, 95% of peak intensity of  $198.2\ \text{Jy/sq arc min}$ . (Right) Contour levels are at 1, 3, 5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 95% of peak intensity of  $5.84 \times 10^{-4}\ \text{W m}^{-2}\ \text{Sr}^{-1}$ .

In Fig. 1 (right), we have plotted the contours of the region due to the extracted PAH emission in UIBs in the  $6 - 9\mu\text{m}$  region. A comparison between thermal emission at  $12\mu\text{m}$  and PAH distribution indicates that the spatial distribution of the warm dust emission is quite similar to the PAH emission. While the ionized gas and the UIB distributions are similar and centred on the source, the cold dust emission is much more extended over the molecular cloud.

### References

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Price, S. D., Egan, M. P., Carey *et al* 2001, *Astrophys. J.*, **121**, 2819