12.5μ IMAGING OF SGR A WEST WITH THE KECK TELESCOPE

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We have used the 10-meter Keck I telescope and the camera mode of the long wavelength spectrometer to observe the central region of the Galaxy at 12.5 μm. The 96x70 As:Si array used had a scale of 0.114 arcsec per pixel. The filter was centered at 12.5 μm and had a bandwidth of about 1 μm. The array was flat-fielded using sky flats from the background. We observed the central 20x20 arcsec region (about 1pc X 1pc) by using a mosaic pattern of the 11x8 arcsec array in approximately half-array steps. The position of the array was determined after the fact by using structure in the flux in the overlap regions. The accuracy of the positioning was better than 0.1 arcsec. The resultant spatial resolution of the final map was about 0.7 arcsec FWHM based on the size of IRS 7 and IRS 3. The demonstrated diffraction limit of the phased Keck telescope at 12.5 microns is just over 0.3 arcsec FWHM, so that the final resolution is a result of atmospheric seeing and chopper smear. The final map is shown in Figure 1. The map is similar, but of much higher angular resolution, to the 12.5 μm map of Gezari (1992, *The Center, Bulge and Disk of the Galaxy*, ed. Blitz, Dordrecht: Kluwer, 23).

One of the primary purposes of the observation was to detect or set a good upper limit on the 12.5 μm flux from Sgr A*. To make this measurement, it was necessary to place the position of Sgr A* on the 12.5 μm map. This was done using the radio maser positions of Reid et al. (1997, ApJ, 475, L111) and the 2.2 μm map of Ghez et al. (these proceedings). A transfer was made from the radio grid to the 2.2 μm grid using the positions of IRS 7 and IRS10. The estimated uncertainty in this transfer is

Y. Sofue (ed.), The Central Regions of the Galaxy and Galaxies, 293-294.

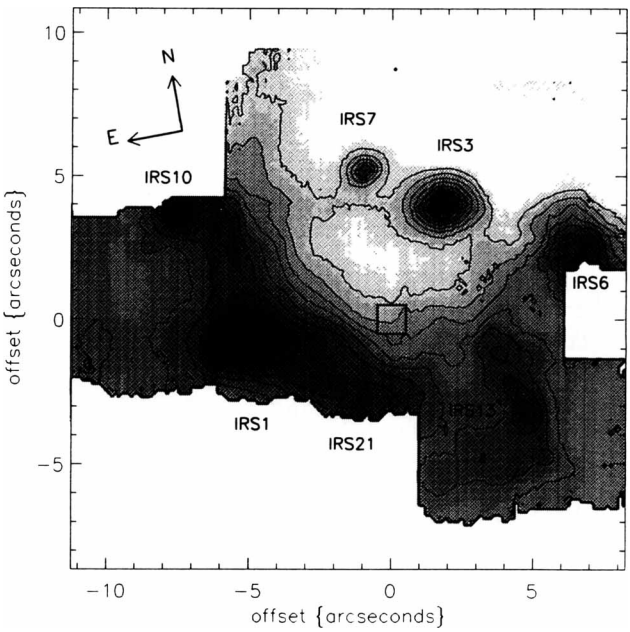

Figure 1. 12.5 μm image of the Galactic Center. Sgr A* is within the box.

estimated to be 0.01 arcsec. The 2.2 μm grid was then transferred to the 12.5 μm grid, assuming that the three sources IRS 7, IRS 1 and IRS 3 have a similar position at the two wavelengths. This transformation has an estimated uncertainty of about 0.03 arcsec. The final position of Sgr A* is shown on Figure 1. The flux at this position is dominated by the extended radiation from the thermal dust emission associated with the ionized ridge to the south. We believe that any point source at the position of Sgr A* would have a flux density at 12.5 μm of less than 50 mJy. The actual upper limit on the emission from Sgr A* is somewhat larger because of interstellar extinction; the corrected limit for the flux would be about 100 mJy. This limit is lower than that implied by fitting a straight line through the detections at 8.7 μm (Stolovy et al. 1996, *The Galactic Center*, ed. Gredel, San Francisco: ASP, 407) and sub-millimeter wavelengths (see Morris & Serabyn 1996, ARA & A, 34, 645).

The 12.5 μm map can also be used to obtain other information about sources in the Galactic Center region. For example, the mini-cavity to the SW of Sgr A* which is clearly seen in the radio continuum from the ionized gas, is also seen clearly at 12.5 microns in our map. Thus the mini-cavity is not only a gas cavity, but also a dust cavity. Other bright compact sources can also be studied with this data set: IRS 1 and 10 are both resolved, and have a FWHM size of 1 arcsec. IRS 3 is unresolved.

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