



New NTT Images of SN 1987A

H- α and N II $\lambda 6584$ images of the nebulosities near SN 1987A that were taken by the NTT on December 19, 1993. H- α images are on the right and N II images are to the left. The upper image of each pair is the raw image while the lower is after deconvolution using the Lucy-Richardson image restoration technique (ESO preprint #975). All images are shown with a logarithmic intensity scale and they are oriented so that north is up and east is to the left. The CCD pixel size in the original image is 0.129 arcsec/px. The filter bandpasses were $\sim 10\text{\AA}$ and the wavelengths were centred to be correct for the redshift of the Supernova. The seeing for the N II image was about 0.7 arcsec (FWHM), and for the H- α image it was about 0.8 arcsec (FWHM). The resolution of the deconvolved image is ~ 0.2 arcsec (FWHM) for the N II image, and it is ~ 0.3 arcsec (FWHM) for the H- α image. In the deconvolved images the flux from star 2 (NW of the inner loop) and star 3 (SE of the loop) have been compressed into single pixels (white dots) at the locations of the star images. The deconvolution procedure produces some "ringing" around bright objects. In the deconvolved images, ringing caused by the inner loop and the two bright companion stars has caused breaks in the very faint outer loops and distortions in the intensity profile near the inner loop.

Note that in the raw N II image star 2 is much brighter than star 3, but that in the H- α image star 3 is much brighter than star 2. This is because star 3 is a Be star with strong H- α emission while star 2 has H- α absorption in its spectrum. The middle star in the line of three stars along the SW edge of the pictures is a close double. The intensity distribution of light around the inner loop is different in H- α from that of N II. Also, while the SE portion of the inner loop is now fading, the bright portions are now increasing in brightness (IAU Circular #5927). It seems likely that interactions between the expanding SN envelope and diluted gas within the inner loop are generating UV photons that are beginning to reionize the nebula.

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