Albinoni NICMOS Photometry

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1 Overview

This document reviews preliminary results of photometry of the NICMOS Albinoni data. It outlines the procedures used to obtain the photometry and summarizes the results as of March 10, 2001.

All the Albinoni data was taken in the F110W filter (central wavelength 1.1 microns and bandpass of 0.6 microns) on November 18, 1998. Table 1 summarizes the data. The MJD in the table is the time at mid-exposure. Exposure time is in seconds. The flux f_ν is in Jy, f_λ is in erg s$^-1$ cm$^-2$ Å$^-1$. The zeropoint for the Vega magnitudes, m_{Vega}, are given by STScI and were generated from the spectrum of Vega, assuming Vega has magnitude 0.02 in the NICMOS bandpasses.

Table 1: Summary of Albinoni Data

Image	MJD	Exp	f_ν	σ	f_λ	σ	m_{Vega}	σ
n57j01vjq	51135.08992	514	6.222E-07	8.7E-08	1.465E-19	2.1E-20	23.71	0.15
n57j01vnq	51135.09939	1026	5.571E-07	4.7E-08	1.312E-19	1.1E-20	23.83	0.09
n57j01vrq	51135.11182	1026	5.094E-07	4.7E-08	1.199E-19	1.1E-20	23.93	0.10
n57j01vvq	51135.15469	514	5.178E-07	8.3E-08	1.219E-19	1.9E-20	23.91	0.18
n57j01vzq	51135.16416	1026	4.283E-07	4.5E-08	1.008E-19	1.1E-20	24.12	0.12
n57j01w3q	51135.17659	1026	4.563E-07	4.8E-08	1.074E-19	1.1E-20	24.05	0.11
n57j01w7q	51135.22120	514	4.395E-07	8.7E-08	1.035E-19	2.0E-20	24.09	0.22
n57j01wbq	51135.23067	1026	3.911E-07	4.8E-08	9.208E-20	1.1E-20	24.21	0.13
n57j01wfq	51135.24310	1026	4.745E-07	5.4E-08	1.117E-19	1.3E-20	24.01	0.12
n57j01wjq	51135.28838	514	5.318E-07		1.252E-19		23.88	
n57j01wnq	51135.29788	1026	4.238E-07	4.4E-08	9.977E-20	1.0E-20	24.13	0.11
n57j01wrq	51135.31031	1026	4.308E-07	4.4E-08	1.014E-19	1.0E-20	24.11	0.11

2 Processing

The processing steps are listed below:

1. Recalibrate Raw Images

   NICMOS images suffer from a number of anomalies that were not anticipated before launch. STScI continues to work on these problems and periodically releases updated calibration files and image processing software. All the Albinoni raw images have been recalibrated using the latest version of the software and calibration files as of March 2001.

2. Do Aperture Photometry

   Run aperture photometry with different apertures to produce growth curve for each image. I used IRAF's "phot" routine and determined the sky background using fitsky's "median" algorithm. With the parameters I used this routine took the meadian of the signal in an annulus 20 pixels thick with inner radius of 10 pixels. I generated growth curves out to 10 pixels to check for poor sky subtraction and the presence of a galaxy background. In most cases the growth curves compared well to a Tiny Tim growth curve. In one case the fitsky underestimated the sky so I set the sky to a constant value that gave a good growth curve.

3. Apply Aperture Correction

   I chose a small aperture of 2.0 pixel radius and a growth curve generated using Tiny Tim to correct the countrates to a 0.5 arcsec (6.67 pix) radius aperture. STScI NICMOS Photometric Calibration Cookbook says multiply this flux by 1.15 to get total countrate for the F110W filter.

4. Convert Countrates into Flux

   I used NICMOS Photometric Keywords to convert countrates to fluxes. The results are summarized in Table 1.

3 Current Status

I reduced the fluxes to a single number by computing the averages and standard error for the 514 and 1026 exposures separately and then taking the wieghted averages of the two. Table 2 below shows the result.

Table 2: Albinoni Photometry

	f_ν	f_λ
514 s exposures	5.28E-07 +/- 0.37E-07	1.243E-19 +/- 0.088E-19
1026 s exposures	4.59E-07 +/- 0.19E-07	1.080E-19 +/- 0.045E-19
Weighted ave	4.73E-07 +/- 0.17E-07	1.113E-19 +/- 0.040E-19

4 To Do

I'd like to check a few things before I declare these results final. Specifically, I need to look at the growth curves I used for aperture correction. The psf depends on temperature of the source, position on the array, and the location of the peak inside the central pixel. I need to explore the size of these effects. I also want to talk with Eddie Bergeron about systematic uncertainties due to STScI's photometric calibration.

Finally there is the issue of galaxy background. It wasn't apparent in the growth curves, but the images are noisy. Over the next couple of days, I'll coadd the images and see if I can pick up the galaxy. I haven't done any galaxy background subtraction.