Document Title	Simulation of microstepping using UFTI data
Document Number	
Issue	1
Date	2/12/02

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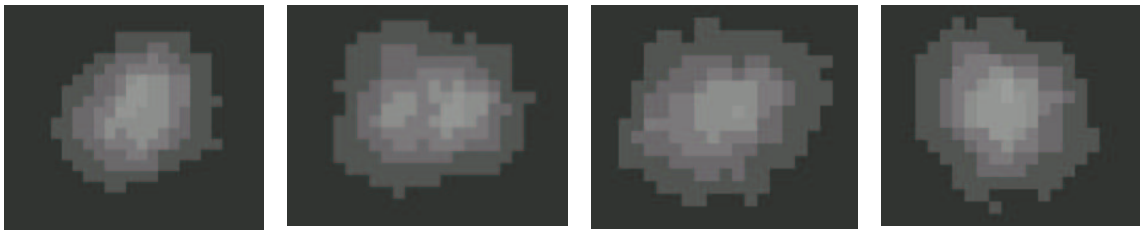
Document Released By:		**Signature and Date**	

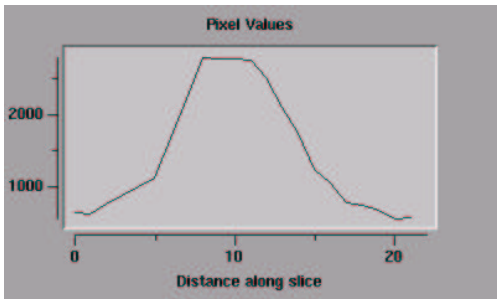
1. SIMULATION OF MICROSTEPPING AND INTERLACING

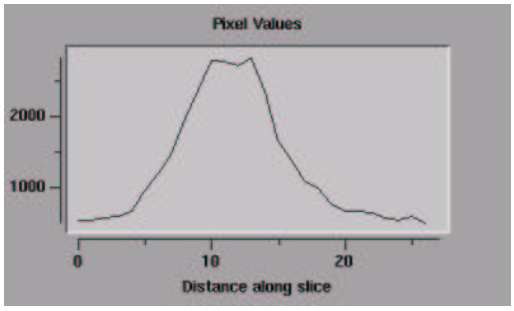
UFTI data was taken on the night of October 23. For these tests fast autoguiding with the tip-tilt stage was enabled.

1.1 0.09" PIXEL UFTI IMAGES

These four consecutive UFTI exposures of FS151were taken with 10 sec exposures in H band. They are displayed on log scale. The cuts are x and y slices through the fourth image. Variations in the psf shape on this timescale are obvious.

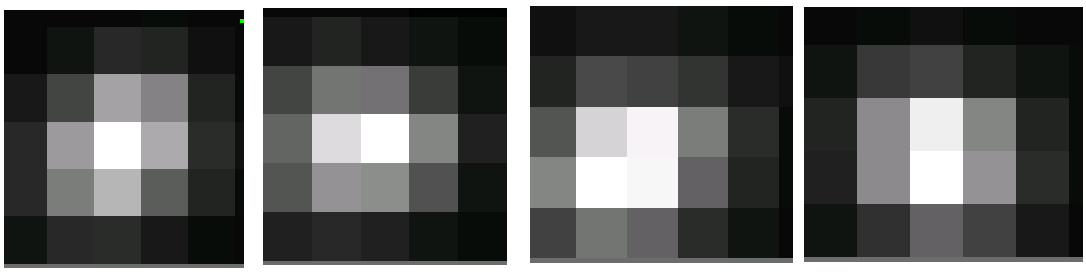






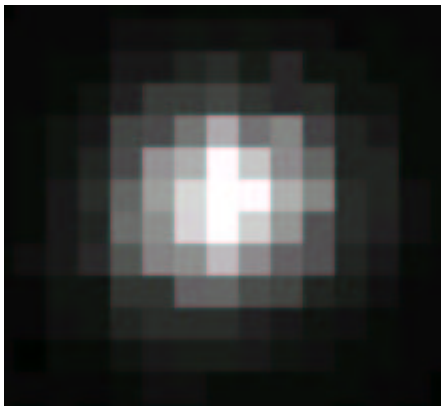
1.2 BINNED 0.36" IMAGES

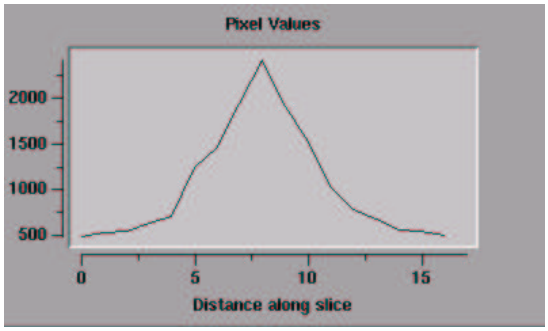
The 0.09" images were "microstepped" by shifting the images (0,0), (2,0), (2,2) and (0,2) pixels and were then binned 4x4 to simulate 0.36 arcsec pixels. WFCAM has 0.4" pixels. The following images show the result of this step.

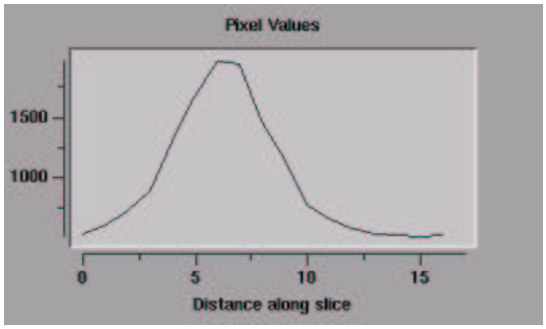


1.3 INTERLACING

The four binned images were then interlaced to give the final microstepped simulated image. X and Y cuts are shown.





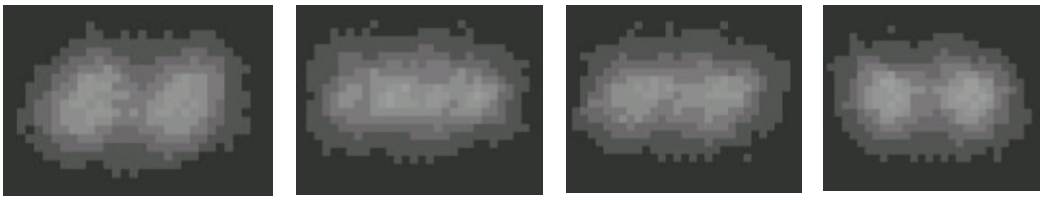


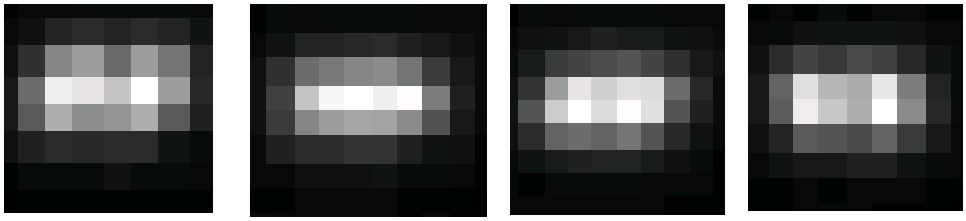
The interlaced image is reasonably well behaved and does not show asymmetries which are any worse than those in individual images.

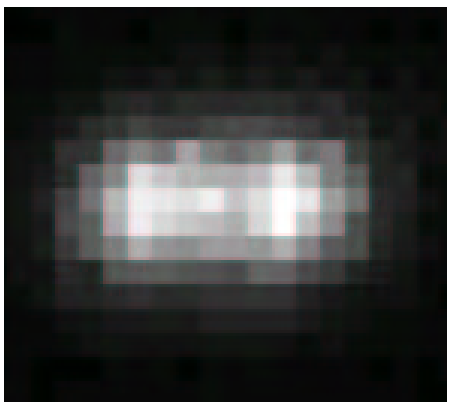
2. BINARY SIMULATION

Unfortunately images of a binary were not available, but the effects of interlacing could be simulated by taking copies of each of the initial UFTI images, shifting them 1 arcsec, adding them and putting them through the binning/interlacing procedure.

Here in order are the 0.09" binary images, the 4x4 binned and shifted images, and the final interlaced image. Intensity scale is logarithmic. Binary separation is 1 arcsec.







3. CONCLUSION

The microstepping has been simulated using real data. No particularly strange psf shapes were produced. A simulation of a binary image shows that microstepping helps with image separation.