For details, see http://cxc.harvard.edu/ciao/why/acissubpix.html

Improve position by fully utilizing 3x3 event islands

ACIS sub-pixel algorithm

coordinate, to remove the instrumental “gridded” appearance of the data and to avoid any possible aliasing effects associated with the spatial grid.

Test 1: Improvement in point source sizes

NGC 1386

(Energy 300-1000keV)

Bin = 1

1/4

1/8

These examples illustrate the improved resolution for a bright extended source.

The top row contains the original image with bin 1/4, and 1/8 pixel.

These can be directly compared to the image below which uses the same bin parameter, but has pixel-randomization removed and a sub-pixel event repositioning algorithm applied.

(Red squares are 1 arcsecond per side.)

Test 2: Improvement in detection of faint sources embedded in diffuse emission

With the improved resolution, we detect ~20% more faint sources when embedded on the extended, diffuse emission in a crowded field. To check whether the new sources are real or due to dithered observations and does not worsen the positional accuracy.

In n,m,

n: number of new sources confirmed in the deeper image.

m: number of new sources not confirmed in the deeper image.

Chandra Re-processing

The new sub-pixel algorithm will be implemented in the next major reprocessing which is expected to start within 2011.