Outlier-rejection can be done using chi2, but doesn't help for L1527

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In June, the 35 files for L 1527 were divided into three temporal bins (with 12, 11, and 12 files, respectively) and chi2 was run, producing results that are shown in the following figure:

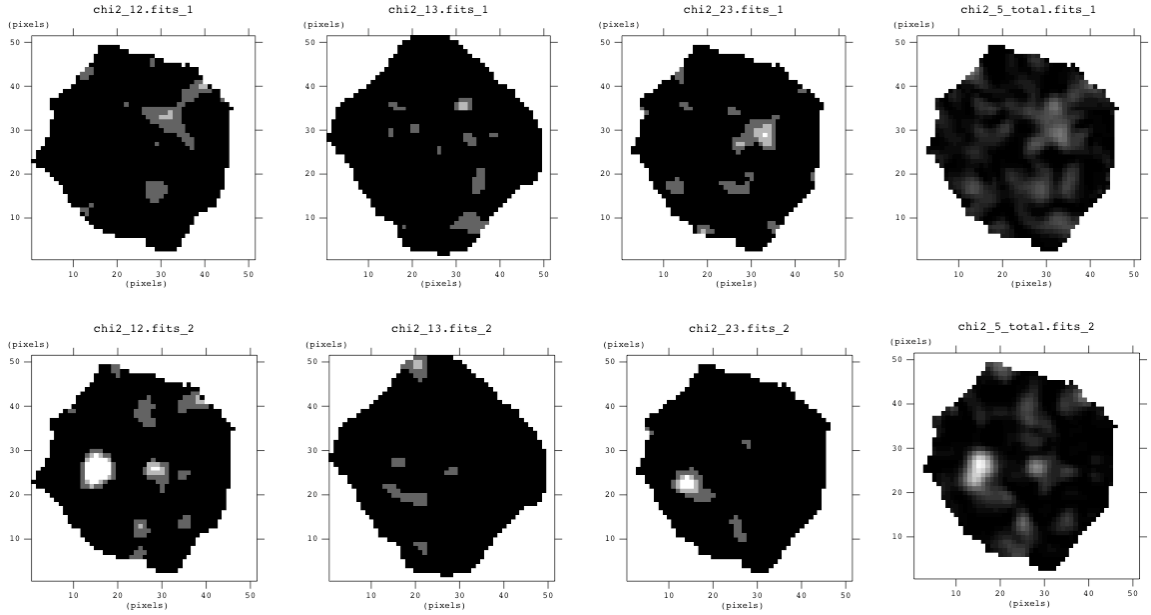

Figure 1: Above are the chi2 results (reduced chi2) for Q (top) and U (bottom): In each case, on the right is the chi2 map for the three bins. Average chi2 is 1.60 for Q and 1.54 for U. Peak chi2 is about 7 for Q and about 20 for U. Note that the peaks in chi2 are neither in the middle (as expected for i.p. problems from a peaky source) nor at the edge, but rather at intermediate radii. (The three maps to the left of the 3-bin chi2 maps are chi2 maps for three different combinations of two bins: 1&2, 1&3, and 2&3, respectively. For these maps, the first grey-scale step is at chi2=5.)

The chi2 program can also be used for outlyer rejection. In this case, I sharpcombined each individual file and compared it with the bin-average sharpcombine file. For the case of file 543, the input file to chi2 "names.list" then looks like this:

combine_543.fits
combine_bin1.fits
combine_bin1.fits

Note that there are three lines in the file.

When used in this way, chi2 will output, for the file "543", a map showing the number of standard deviations of discrepancy between file 543 and the "bin 1" result which is obtained from 12 files (543, 544, 545, etc).

Note that in producing all of the above sharp_combine_v5 files, i.p. correction is turned off. (Since the i.p. does not change by more than ~0.2% during the time-span of bin1, there error introduced in this way is insignificant.) Note also that for producing individual files like combine_543.fits, etc., background correction is turned off.

All 35 files were studied, and those having a mean chi2 greater than 2.3 (for either Q or U) were discarded. The remaining 28 files were analyzed using chi2 (with i.p. and backgournd correction on) and the result was that the chi2 got worse. The values for Q and U went to 2.1 and 1.6, respectively. Apparently, for the L 1527 data set at least, throwing away files that are significantly different from their neighbors does not help. Our systematic error for these data must be due to something other than occasional bad files.

Flags used for this analysis:

sharpinteg: -w, -em

sharpcombine: ps=9.5 pm=12, bg 10 0, otherwise standard flags

pointing and smoothed tau as posted in May 2008 memo