SHARP data analysis on IRAS20126+4104 data set
Hiroko

- Initial data inspection and pointing correction:
I first analyzed the data with sharpinteg_2 with flags of "-c -f 1 -w -sil". These options were chosen solely for the purpose to derive the pointing offsets. (The flag "-w" is for replacing blank pixels to good ones.) Firstly, I selected the data that are taken in proper condition (chop throw, chopper efficiency, data sections for different HWP angles, HWP angles, and saturation). After extracting the good data files, Darren's "fitgauss" is used to derive the pointing offsets of each data file. Options used were "-p -d" as all files include a bright peak feature.

- Sharpinteg
  For science data reduction, I re-ran the sharpinteg_2 with flags of "-c -f 1 -sil -em". (In my previous process with sharpinteg2 last year, I didn't have the "-em" flag. "-em" flag is for inflating signal errors less than median signal error to median.) I chose not to use -w flag for keeping the data as they were taken, for keeping the accuracy. There were six files that generate "near saturation" warning message at different times, saved in the file called "sharpsolve_errlog.txt". This is leftover from sharpsolve. Larry confirmed that sharpinteg checks saturation prior to the tossing of bad pixels. Accordingly, these messages are generated even when all pixels used are actually fine. According to Darren, the threshold that he defined is 3.5V. As long as RGM marks bad pixels, final fits files should be good. And it turned out that RGM was blocking out all saturated pixels for this case. Accordingly, we used all of these files to calculate the final results. The number of files extracted are 140 in total for data analysis.

- Sharp_combine
Sharp_combine v5.14 (last updated 2009 Apr 22) was used to process polsharp5 to obtain Q&U and use chi2. (Note: The current sharp_combine version takes care of PA/EL properly.) The command used for this process is as follows.

sharp_combine listname listname.fits -hwp 93 -l 51 51 -ma 5 -sm 2 -ps 4.75 -pm 6.3 -q -bg 30 0 -ip 0.0034 0.00017 0.0036 0.0

(hwp 93 is based on email from John sent on Oct 30 2007, 93 +/- 3 degrees.)

-Reduced chi2

The data are divided into 4 and 8 bins. Result fits files of each bin have similar statistical weights on Q/U. This time, chi2 version v2.4 was used.

chi2 -f chi2_090630_4bin.list

Summary of results for whole map:
Reduced Chi Squared mean and standard dev. for the I map: 2.986200, 10.657962
Reduced Chi Squared mean and standard dev. for the Q map: 1.449916, 1.229938
Reduced Chi Squared mean and standard dev. for the U map: 1.756281, 1.411173

chi2 -f chi2_090630_8bin.list

Summary of results for whole map:
Reduced Chi Squared mean and standard dev. for the I map: 3.211457, 7.054469
Reduced Chi Squared mean and standard dev. for the Q map: 1.715588, 1.244402
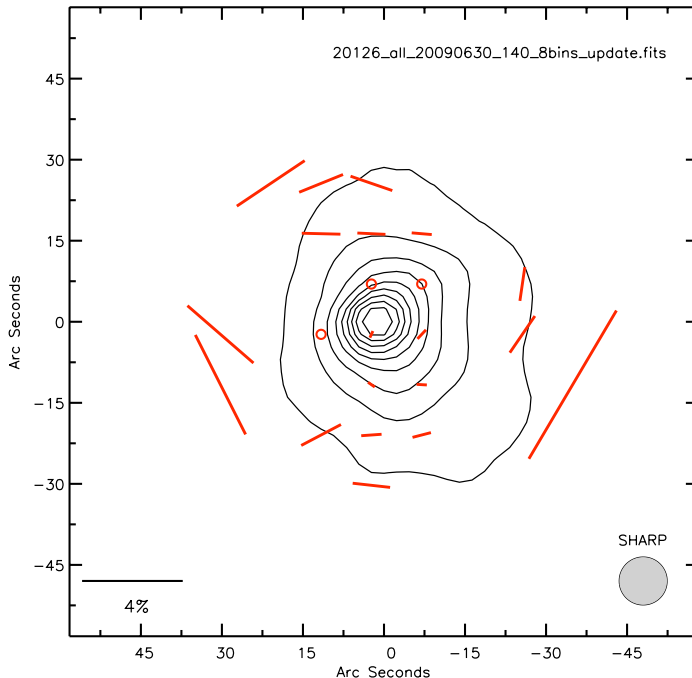Reduced Chi Squared mean and standard dev. for the U map: 1.491416, 0.847323
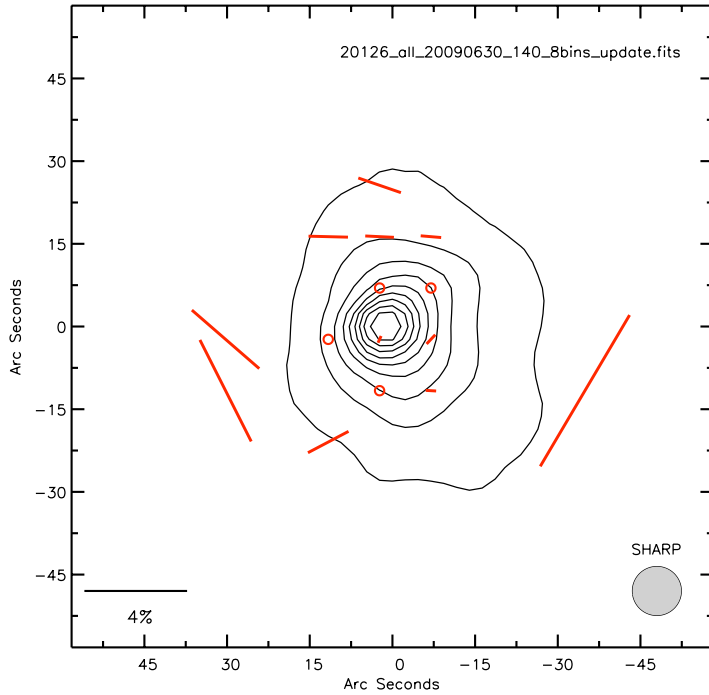
- Result maps

Following maps are made using polsharp5.
 polsharp5,'20126_all_20090630_140_8bins_update.fits',/
vec,skipv=4,maxsig=2,color=2,onep=1,/ps

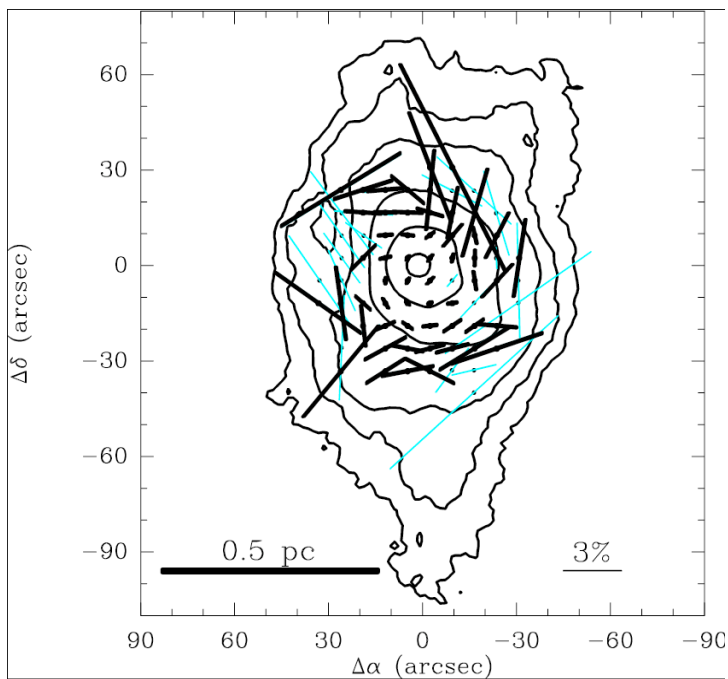2 sigma (error inflated)

2.5 sigma (error inflated)

20126_all_20090630_140_8bins_update.fits

Polarization map as of 2008/04/15

Result maps obtained this time look very similar to what we got from analysis done before April 2008.