XFPR User Guide : Preliminary

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The program entitled XFPR was developed using the IDL widget tools and provides the user with a graphical interface. This program can be executed from the IDL V4.0 prompt by typing the following two commands:

IDL> **.rnew xfpr**

IDL> **xfpr**

The main XFPR screen is shown in Figure 1. This screen enables the user to easily input the file names of the under-sampled observations, select the user defined parameters, and execute the algorithm. The set of sixteen boxes at the top of the screen are fields for entering the file names of each observation. Each columns denote the samples separated by a fraction of a pixel in the x direction and the rows contain the name of the samples separated in the y direction. These fields can either represent observations separated by 1/2 of a pixel, 1/4 of a pixel or some combination of both. These fields can also be loaded automatically using an ASCII text file containing a list of names. This is accomplished by first constructing a text file with the name of each observation listed on a single line. The names should be ordered from left to right and top to bottom. Then, the name of the file containing this list is entered into the "Optional File List" field. Finally, the names are loaded by selecting the **Load Image List** button in the lower left hand corner of the screen. Figure 1 shows the results of loading the list file, "test.lst", which contained the following entries :

```
../nrldata/w19.fits
../nrldata/w18.fits
../nrldata/w16.fits
../nrldata/w17.fits
```

The remaining toggle buttons and fields allow the user to select or set a variety of input parameters. The first two sets of toggle buttons enable the user to independently select whether two or four samples were acquired in both the x and y directions. The next set of buttons specifies the input and output file format used by the program. XFPR will either read or write FITs or raw data files. The file size parameters allow the user to specify the x and y size in pixel of each of the input observations. These parameters are only used when the input file type is specified as "Raw". When the input files are in FITs format, the size is obtained from their header information. The pixel averaging option determines whether or not each sub-pixel in the co-added images is represented by only one of the observed pixels or the sum of its nearest neighbors. Even though this process increase the observed signal to noise ratio, it also introduces a substantial amount of additional spectral distortion and should only be used in very low signal to noise environments. The cosmic ray removal toggle determines whether or not a statistical is used to remove high energy points in each input image prior to co-addition. The next two fields allow the user to deconvolve an additional point spread function (PSF) by selecting this option and entering the corresponding file name. The final

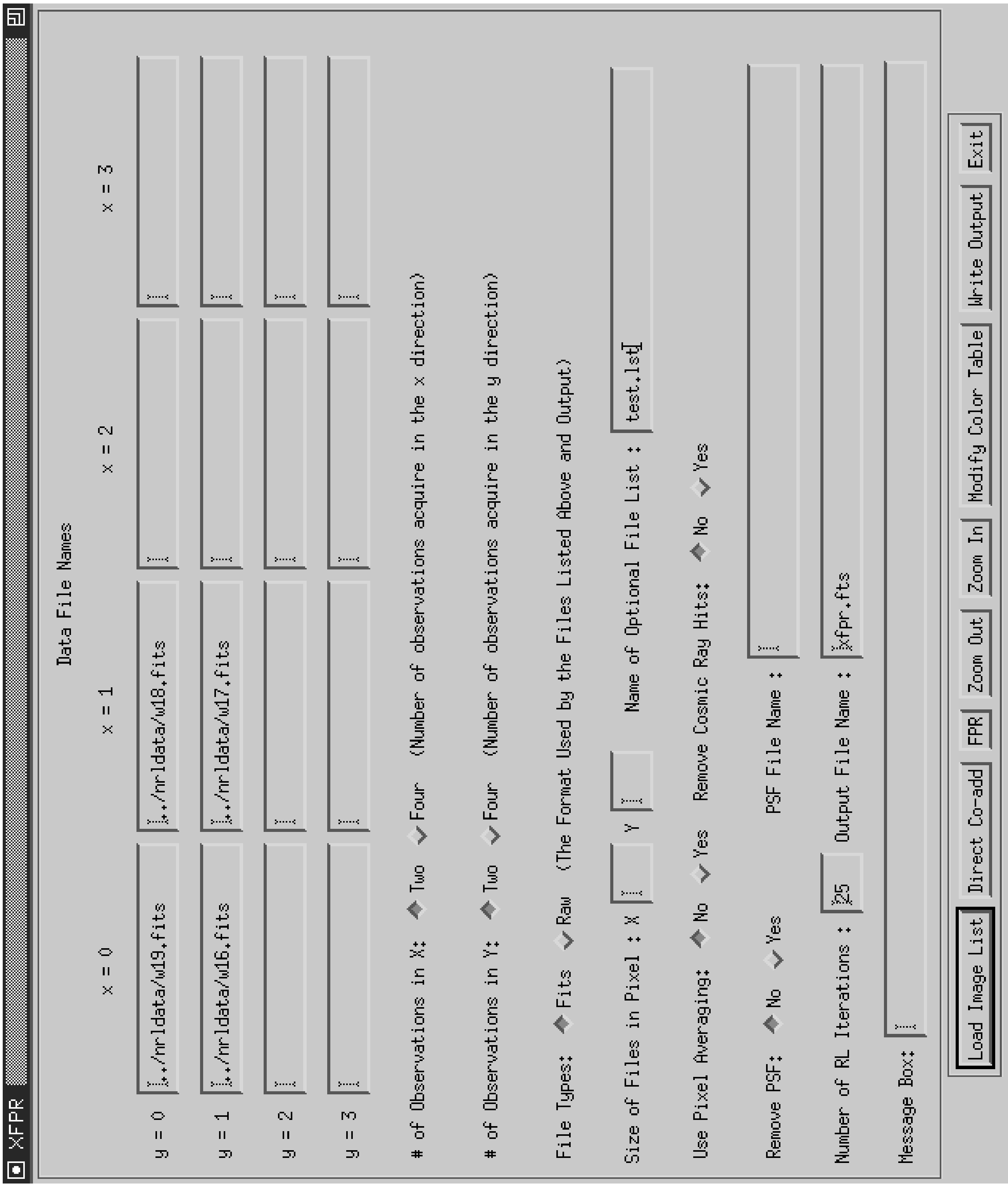

Fig. 1.— Example main screen for the IDL program XFPR.

two fields allow the user to input the number of Richardson-Lucy iterations used by the FPR algorithm, and the file name to which the current reconstruction is to be written. The message box at the bottom of the screen is a non-editable field used to display status and error information.

The eight buttons at the bottom of the screen enable the user to select which function is to be performed. The purpose of the **Load Image List** button is described above. Both the **Direct Co-Add** and **FPR** buttons display the results of either simply co-adding the observations listed above or applying the FPR algorithm to these inputs. The **Zoom** buttons enable one to expand the current display window in integer steps anywhere from its original size to a 512×512 pixels. The **Modify Color Table** button produces a standard IDL pop-up menu used to modify the color lookup tables of the image display window. The **Write Output** button writes the contents of the display window to a file whose name and type are specified by the "Output File Name" and "File Type" widgets. Finally, the **Exit** button returns the user to the main IDL prompt.