quick-start guide version 4

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software installation

The software can be downloaded from `http://ncnr.nist.gov/equipment/he3nsf/data_redux.html` http://ncnr.nist. 64 bit versions are available for Linux and Windows. The software is in a ZIP file for Windows, which you can right-click and then extract all. The software is in a tar.gz for Linux, which you can gunzip to a tar file and then tar -xvf tarfile. Both distributions will unpack into a Pbcor directory. The Windows distribution contains a standalone executable, *pbcor64.exe*. Unix platforms already have moved to prevent copying libraries from inside an executable to the file system (this is what the standalone version does), so we anticipate that Windows will some day make the same decision. Version 4 also now includes a separate executable *pbsCL(.exe)* that can be launched from the *pbcor64* gui to handle doing the polarized-beam data correction as a background process. These considerations mean that *pbcor* must now be able to determine the distribution location on the file system.

For Windows the simplest thing is to double click the *pbcor64.exe* from the distribution folder. If you wish to start *pbcor64* in some other way (for example using a shorcut) you can identify the distribution location by double clicking the *pbcorDir.bat* file in the distribution folder. A third option is to save the distibution folder, *Pbcor*, in a standard location C:\Users\yourUserName. The Windows distribution also includes the Visual-C run time library VCRUNTIME140.dll appropriate for the version 4 build. Most Windows10 computers will have this library. If not, with admin priveleges copy this dll into the Windows/System32 folder. This should allow pbcor64(i).exe to run.

For Unices you can save the distribution folder, *Pbcor,* in one of the standard locations /usr/local/lib or /home/yourUserName. Alternatively, set the unix environment variable from bash, *env pbcorDir=distributionFolderPath.* You will need an installed tcl-tk distribution with the wish program which is usually found on unices. You must source (bash command source) the pbcor64Setup bash script to find your wish program (must be in PATH) and setup pbcor64 and pbcorWatchServer scripts, and add the distribution location to your PATH. The program then is started by running the pbcor64 script (should be exectable after running the pbcor64Setup script).

All documentation is in the Doc folder in the distribution.

quick start procedure

The following are the basic steps to use the software to correct polarized beam data on BT7 or MACS for polarization efficiency and transport.

- START: Start the pbcor64 executable.
- YOUR DATA: In the FILE menu click on “select data directory” and navigate the file tree to your data directory
- SUPPORT FILE: The data directory must contain the He3-cell-files supplied by support staff for the analysis. The He3-cell-files appear in the group options->cellFile menu.
- GROUPS: From the “File Selector” read data files you want to correct into the current group. The basic information from each file gets displayed. Put files into separate groups of polarized beam points. For example, vertical and horizontal field mode data are often corrected in different groups (and possibly with different He3-cell-files).
- SUBTRACT BACKGROUND: If fast background value is available, enter the value from Edit -> Subtract Background and then do the subtraction.
- CONFIGURE SOLUTION: In “group options” select the experiment configuration-file (He3-cellFile), monochromator/filter and beam-monitor options, tolerances, and cross-section constraints. You must constrain any missing flip-states (or set them as zero). Tolerance is important as it determines the grouping into polarized beam datapoints (where all coordinates are equivalent by tolerance except for the spin-flip state).

- SOLVE: Make sure you are in the group you want to solve and press the SOLVE button. You may see WARNINGS or ERRORS in the "pbcor log" window. Most commonly, these refer to polarized-beam datapoints that could not be solved (missing flip-states for example). You can diagnose these problems by going to the FileViewer and checking the presoln-bins option. This displays the file that holds the tolerances set for this solution and the polarized-beam datapoints that were formed from the binning process. The bin file lists the datapoints and the measurments that belong to each datapoint. It lists the flip-state for each measurment, the He3-cell index from the He3-cell-file (-1 means missing a cell), the coordinate values for each measurment and finally the source filename and file point number for each measurment. If there are results of the binning that you wish to change you will need to adjust the tolerances. Version 4 has added the ability to do solutions in a background process for very large datasets (10's of thousands of datapoints), and leave the gui free for other activities. This is implemented by the "SOLVEbg" button. Go to File -> Open bg job, where you can update the status of jobs, setup polling for status-updates, start or kill jobs, and enable the background watch server to view the background progress. When a background job finishes the "Update Status" will plot any completed jobs as the current group solution.
- SOLUTION FILES: This solution is stored in files with the root name as groupFirstFileName_g(groupNumber).(version The versionNumber allows that solutions are never overwritten. The solution file extensions are *.p for the solved polarized-beam datapoint cross-sections and errors, *.m files which list all the measurments (the invalid measurments will have 0 for the datapoint number), and *.bin files which also list the measurment but groups them by datapoint and show the coordinates that correspond to tolerances only. The solution also takes each native datafile in the group adding a *.pbcor extension and overwriting the detector counts with the corrected counts (and writing error column for the correction as well). This is useful when using analysis and plotting software that expects native format for the data files. Note that the *.pbcor files are not versioned and get overwritten everytime a solution is performed.
- SOLUTION PLOTS: The gui creates a plot for each group solution that holds only the most recent solution, labelling in the window border the filename of the solution. There is an automatic procedure for choosing the best X-coordinate for the plot. If you want to make this choice, go to Edit -> Select X data column. When you press the "Apply" button your choice remains in effect until you remove it. If you want to view plots of previous solutions, go to File -> Open prev solutions. Press the "Get previous solutions" button and then select from the listbox the ones you want to plot before pressing the "Plot selected solutions". You can save any visible plot or any visible gui window from File -> find and save windows. The "save selected windows" button is slow with a 10 cm x 10 cm window taking on order of 30 seconds. Using the "system window save" (Snipping Tool on Windows) may be more convenient.
- SAVE YOUR WORK: In the FILE menu click on "save session". The next time you start "pbcor" it will remember what you have done. This also allows me (Ross Erwin) to debug any problems you have with the software.

New in version 4

- pre-soln bin files to diagnose solution issues.
- solution WARNINGS and ERRORS are now in a text window for permanent viewing.
- versioned solutions and viewing previous solutions.
- solving as a background process.