HFBS Data Reduction Using DAVE

Users of HFBS can reduce (and analyze) their data sets using the software package called DAVE (Data Analysis and Visualization Environment). This package is freely available from the NIST Center for Neutron Research and can be downloaded from http://www.ncnr.nist.gov/resources.dave.

In this document we will describe how to reduce your data using the tools within DAVE.

Getting started

First, launch DAVE. You should see a screen like the one shown in figure 1. You should also set up the environment so that your files are easily accessible. This can be done using the "File-Raw data directory" and "File-Working directory" menu items. As the names imply, you should choose the location for the raw .HFBS files as your raw data directory and the reduced data should be placed in the working directory.
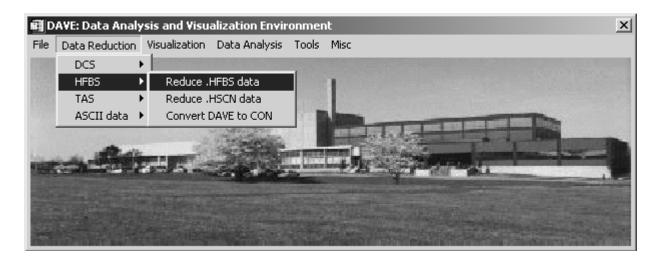

Figure 1   Opening screen of DAVE.

Now that the environment is set up, you can proceed with the reduction of your data. There are two types of data that can be collected on HFBS. When the Doppler drive is stationary and the elastic intensity is recorded, these types of measurements are called FIXED WINDOW SCANS. When the Doppler drive moves the measurements are called DYNAMIC RUNS. Let's assume that you wish to reduce data taken in a DYNAMIC RUN. These files have the extension .HFBS.

Select the menu item HFBS→Reduce .HFBS data. You will get the screen shown below.
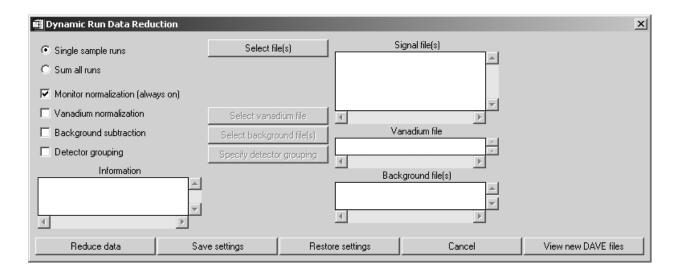

Figure 2 HFBS data reduction utility.

Single/Multiple file treatment
You can select multiple files simultaneously by pressing the button labeled *Select file(s)*. These runs can be summed together or treated individually by pressing the appropriate (exclusive) radio button labeled Single sample runs or Sum all runs.

Monitor normalization
Note that the data will always be normalized to the beam monitor placed before the sample.

Vanadium normalization
Checking this box sensitizes the button labeled *Select vanadium file*. Press this button to select the appropriate vanadium run (another .HFBS file).

Background subtraction
Checking this box sensitizes the button labeled *Select background file(s)*. Press this button to select the appropriate background (e.g. empty can) file(s). If more than one file are selected here then they are summed together before the subtraction is performed.

Detector grouping

Checking this box sensitizes the button labeled *Specify detector grouping*. Press this button to launch another dialog interface (shown below) where you can specify which detectors go into which final groups.
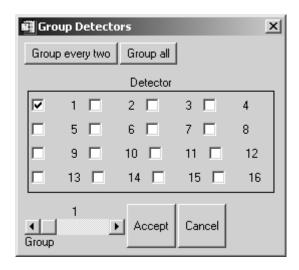

Figure 3 Detector grouping dialog interface.

Accepting this without modification (i.e. pressing the *Accept* button) results in detector 1 going into group 1, detector 2 going into group 2, etc. , in the file that results from this reduction procedure.

You can also press the *Group every two* button which results in the sum of detectors 1 and 2 being put into group 1, detectors 2 and 3 being put into group 2, etc.

Pressing the Group all button results in detectors 1-16 being summed into group 1.

Finally, you can move the slider bar that specifies the destination group and check whatever boxes (detectors) you would like to go into that destination group. For instance, if you check off boxes 1,2, and 3, with the slider at position 1, then the output group 1 contains the sum of detectors 1,2, and 3.

Saving and restoring settings

Once you are satisfied with the configuration you can press *Save settings* which will remember how you have configured the reduction process. You can restore these settings in a future DAVE session if you like by pressing *Restore settings*.

Reducing the data
Press the Reduce data button.

Looking at the reduced data
Once you get a message that states that the data has been sucessfully reduced, you can press the *View new DAVE files* button.   An application with a graphics window will be launched that shows your data.   Changing the slider bar cycles through each group. When you are finished, press the *Dismiss* button.
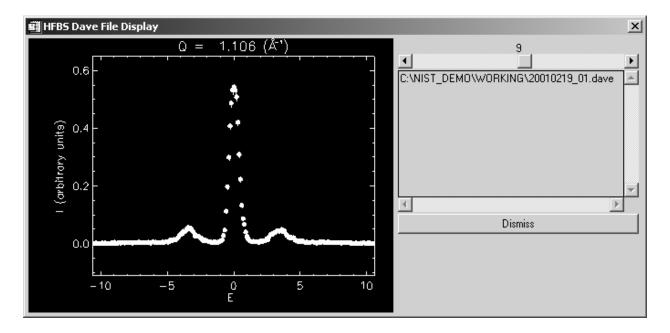

Figure 4 The DAVE data viewer for HFBS data sets.