## How to Use **multizg**: A Note on Running Multiple and/or Overnight Experiments

If you have one sample that requires a full characterization (e.g., you need to run $_1H$, $_{13}C$, COSY, HMBC, HSQC, etc), you do not need to wait until the previous experiment finishes to start the next one.   There is a way to set up multiple experiments on the same sample and have them run automatically.

**multizg** runs experiments that you have already set up within the same experiment folder sequentially.  If you have only set up one, it will automatically create multiple experiments with the same parameters (useful for overnight signal averaging).  This means you don't want to have to sit there waiting for each experiment to finish, then type **zg** after each one to start the next. These commands work for both 1D and 2D experiments.

**multizg** to set-up multiple experiments

1. Create a **new** dataset. Insert your sample, lock, tune the probe, shim, etc. Read in the parameter set for the experiment you wish to run with **rpar**.
2. Create **new** experiment files for each type of experiment you want to run. Keep the same folder (data set *NAME*) but change the *EXPNO*.
3. Go back to the first experiment of the list (**re X**, where *X* is *EXPNO* of your first experiment).
4. Execute the **multizg** command. A pop-up window will ask you "How many experiments do you want to perform", so enter the number of experiments that you created. The default value is 10.
5. At the end, multizg will open one more window telling you it is about to start acquisition, and how long the total experiment time will be.
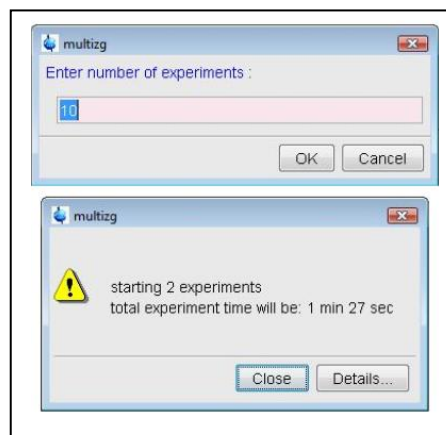
**multizg** to signal average for extended periods of time

This method is recommended for overnight acquisition (compared to increasing ns or td0 to make one single EXPNO that will take 12 hours to acquire).  Simply set up multiple short (30 minute – 1 hour) acquisitions and add up the time domain data at the end.  Then use **fidadd** (**adsu** for 2D NMR) to add the data up.

1. Create a **new** dataset in *EXPNO 1*. Insert your sample, lock, tune the probe, shim, etc. Read in the parameter set for the experiment you wish to run with **rpar**.
2. Make the necessary changes to your acquisition parameters (e.g., d1, d8, aq, td, etc).
3. When it comes time to change ns or td0, set it up so that the experiment will take 30 minutes to 1 hour (up to you). You can use **expt** to determine how long the experiment will take.

Note: You may need to type **xau multizg** instead of **multizg**.

4. Check how long it will take with **expt**, so you can decide how many experiments you want to run. E.g., if you want to acquire for 10 hours overnight, you need 20 x (individual 30 min) scans.
5. Type **multizg**.  This will pop open a series of windows.
    a. The first window will ask you how many experiments you want to run (the default is 10).
    b. Change this value if you like, then hit enter to go through all of the prompts.
    c. At the end, multizg will open one more window telling you it is about to start acquisition, and how long the total experiment time will be.
6. Later you can return to *EXPNO 1* (**re 1**).
7. You will want to add up all of the time domain data before processing your spectrum.
    a. For 1D data: type **fidadd** to add up all of the data.  Follow the prompts, and enter how many experiments you want to add up.
    b. For 2D data: type **adsu**.  Follow the prompts, and enter how many experiments you want to add up.
    c. A new *EXPNO (*21*)* will be created that combines data from 20 experiments you ran.
    d. Process as normal: **ef; apk; abs** for 1D data or **xfb; absb** for 2D data.
8. When you have the data you want, delete any data you don't need, e.g., 1-20.

Note: You may need to type **xau multizg** instead of **multizg**.