

¹H Observe Homonuclear (¹H) Decoupling

This guide is written assuming proficiency in basic operation of the Varian NMR instrument. You should be experienced in performing basic 1-dimensional NMR experiments before attempting to perform more advanced experiments on your own. Please ask for help the first time you perform this, to prevent mistakes and to minimize your frustration.

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Considerations: Homo-decoupling is easy to setup; however, it often requires several iterations in setting the decoupler power (*dpwr*) to achieve optimal results. Too much power will result in decoupling more than the desired resonance, and too little power will result in incomplete decoupling.

- 1) Setup for a normal proton spectrum ([Setup] [Nucleus,Solvent] ...etc.).
- 2) Take a normal spectrum (nt=4 or as few scans as necessary to see signals), then zoom-in on the region containing peaks using the cursors... then type **movesw** <Ret> , then **ga** again to acquire a narrowed spectrum.
- 3) SAVE this spectrum so that you can re-load it to select another multiplet for decoupling.
 - a) Due to Bloch-Siegert shifts, you need a fresh, “undecoupled” spectrum to accurately set the decoupling frequency. You do not want to start with a decoupled spectrum to select a new multiplet for decoupling.
- 4) type **homodec** <Ret> to setup for homonuclear decoupling.
 - a) (FYI: this sets the following parameters: homo='y' dpwr=22 dm='nny')
- 5) Zoom-in closely on the multiplet that you wish to decouple, then set the cursor exactly in the center of the multiplet, then type **sd** <Ret> to set the decoupler in the center of this multiplet.
- 6) Set the number of transients (nt= #)... do at least 4 transients.
- 7) Type **ga** <Ret> to acquire the ¹H decoupled spectrum.
 - a) Look at the spectrum, and see if (a) the multiplet being decoupled is completely eliminated, and (b) the peak formerly coupled to the *decoupled* resonance has been simplified.
 - b) You can increase/decrease *dpwr* around the starting value of 22 to increase/decrease the decoupling bandwidth. i.e. **dpwr=20** to decrease the decoupling power by 2 dB, or **dpwr=24** to increase the decoupling power by 2 dB. NEVER increase the decoupler power (*dpwr*) above 36!
 - c) Re-acquire as necessary until the desired decoupling is achieved.
 - d) Save this spectrum, noting the peak that was decoupled in the filename... so you know which peak you decoupled when you want to examine the data later.
- 8) If you wish to decouple a different multiplet, you should re-load the original, narrowed ¹H spectrum, that you saved in step #3 above. then repeat steps (4) through (7) to select the new multiplet for decoupling, and acquire a new decoupled spectrum.

-R.Shoemaker