COSY

COSY (Correlation Spectroscopy) spectra are 2-D proton homonuclear spectra that correlate one-bond j couplings. A basic COSY pulse sequence is comprised of two 90-degree pulses. The basic COSY (upper case version) accesses a probe file and uses linear prediction, presaturation of solvent is an option.

Setting up a basic COSY:

1. Find the proton 90-degree pulse width. Collect a 1-D proton spectrum and adjust the sweep width, **gain**, and **tof**. Set **pw=pw90**. Make sure **probe='HCN'.**
2. Call the macro for COSY by >**COSY.** Use >**dps** to look at the pulse sequence.
3. Set **pw, d1, nt, ni,** and **phase=1**. Make sure **sw=sw1**. Check the length of the experiment >**time**.
4. Use >**go** to start the experiment.
5. To processing a upper case COSY:
   >**setLP1**
   >sinebell
   >wft2da

This processing applies linear prediction. To turn the linear prediction off, set **proc1='ft'** and leave out the **setLP1** step in the processing. Be sure to move the vertical scale up and down because artifacts from noise can be created. To apply a symmetrization of the data, use >**foldt**.

BEWARE: symmetrization can create artifacts and can cause loss of information in some experiments.

Adding presaturation to basic COSY:

Instructions can be found in the manual page: **man('COSY')**. Set **d1=0**, **satmode='y', satdly=1.5, satpwr=2, satfrq=tof.** The **satfrq** is not required to be equal to the **tof**. Values of **satpwr** and **satdly** vary with the sample. Do not use **satpwr**>10dB.

Notes on COSY:
Protons with very small coupling constants may not show up. Sometimes using many increments (**ni=1000**) will detect these. Also for small molecules be sure to use a long enough delay (**d1**).

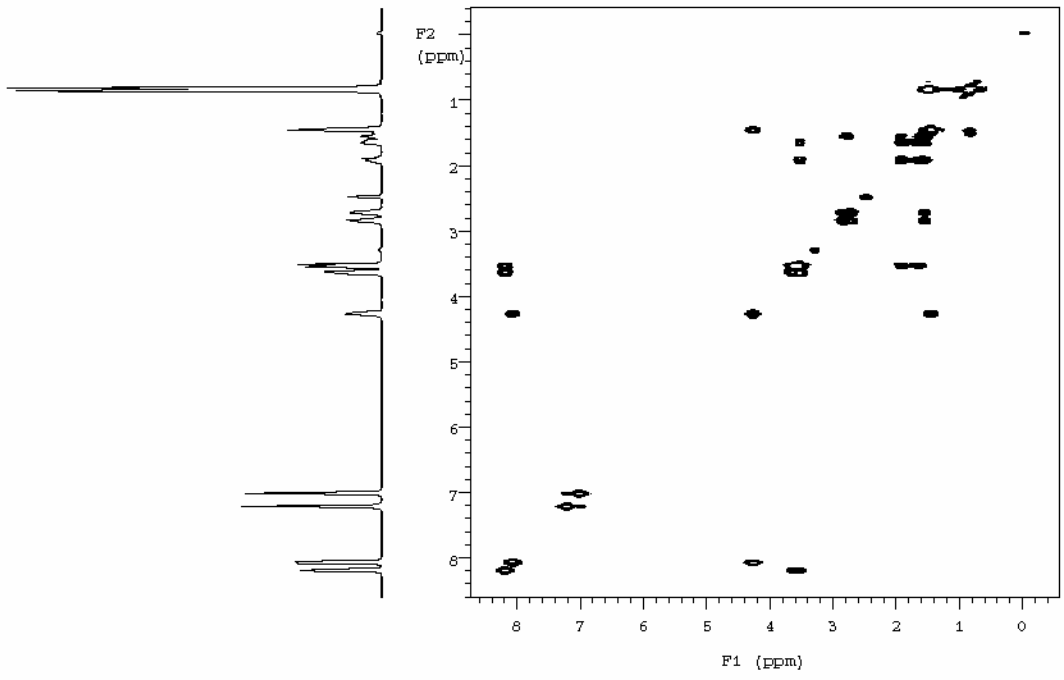

Figure 27: A simple gCOSY spectrum of a three-residue peptide, shown with the vertical projection, is usually very symmetrical about the diagonal.

Versions of COSY

gCOSY – gradient version of the upper case COSY, faster if abundant sample, allows down to **nt=1**. With **nt=1** and **ni=128**, a gCOSY can be run in as little as three minutes. Gradient COSY is called by >**gCOSY** and is processed with linear prediction similarly to basic COSY. Be sure that **gcal** is set in the probe file. In gCOSY, **phase=1**. No presaturation option available. Make sure **probe='HCN'.**

cosy (lower case) – older version of COSY, no gradients
Set up by calling >**cosy** and setting **pw, sw=sw1, nt=4** (min.), **d1**, and check >**time**.

cosyps (lower case) – phase-sensitive COSY, no gradients, similar to **cosy**, but allows solvent presaturation option and data is phase sensitive. Minimum **nt=4**.