

## Lock: The Deuterium Lock Feedback Loop

The “lock” is a second NMR spectrometer, running continuously in the background, that detects the deuterium ( $^2\text{H}$ ) in the solvent. The  $^2\text{H}$  frequency is 1/7 of the  $^1\text{H}$  frequency, so they are on completely different radio “channels”.

The purpose of the lock system is to maintain the magnetic field strength constant during the NMR experiment. Without a lock, the field would gradually change or “drift”.

### Steps in Locking:

- Set Lock Parameters for Your Deuterated Solvent:
  1. Lock Power: Radio Frequency Power in to  $^2\text{H}$  Nuclei
  2. Lock Gain: Amplification of Received  $^2\text{H}$  Signal
  3. Lock Phase: Phase of the  $^2\text{H}$  NMR Peak
- Adjust Magnetic Field to Center the Lock  $^2\text{H}$  Peak
- Turn on the Lock Feedback Loop

Any “drift” in the magnetic field will move the  $^2\text{H}$  peak left or right in the  $^2\text{H}$  spectrum. This is detected as an error signal which changes the current in a coil to move the field back to its original strength.