

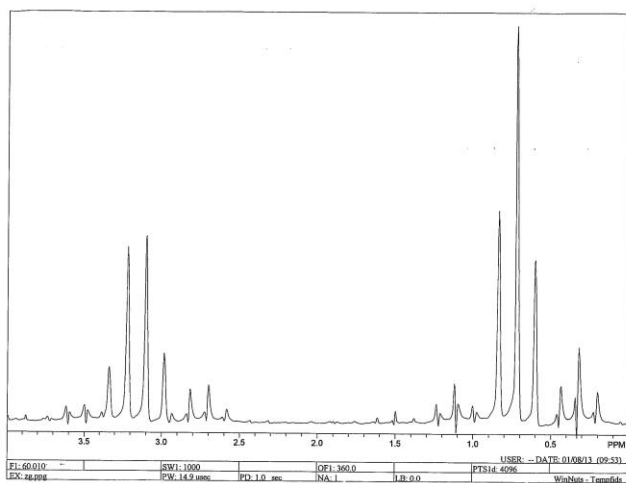
EFT 60 Facts

H-1 frequency - 60 MHz
C-13 frequency - 15 MHz

Field is 1.38 Tesla or 13,800 Gauss

Permanent Magnet that operates at 37 °C

Ethanol H-1 spectrum on EFT 60



Note:

- 1) The peaks appear at about the same chemical shift in both spectra. They would be exactly the same if the same sample were run on both and if the instruments were tuned and calibrated prior to use.
- 2) The splitting of the peaks appears to be greater for the low field instrument. This is to some extent an illusion in that the splitting is the same in Hz (about 10 Hz) but on the EFT 60 10 Hz is 0.17 ppm (the distance between adjacent peaks) whereas 10 Hz is 0.025 ppm on the Avance III 400!
- 3) The peaks from hydrogen nuclei on different carbons appear to be separated more from one another in the spectrum of the Avance III 400. This results primarily from the splitting being smaller in ppm (in other words from the same reason as in (2) above).

Bruker Avance III 400 NMR Facts

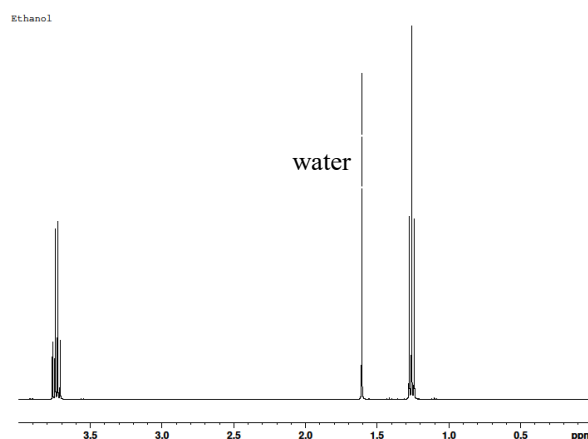
H-1 frequency – 400 MHz
C-13 frequency – 100 MHz

Field is $1.38 \times 400 / 60 = 9.2$ Tesla or 92,000 Gauss

Superconducting "electromagnet" that operates at 4 K (-269 °C).

The chemical shifts (δ) are the same as on the EFT 60 in ppm and the J values are the same in Hz.

Ethanol H-1 spectrum on Avance III 400



Principles Lab: *Work in pairs.*

Collect a H-1 NMR spectrum of 2-butanol and ethylbenzene on both the EFT 60 and the Avance III 400. On both instruments plot a "normal" spectrum and plot an expanded one (it should cut out the parts of the spectrum with no peaks).

Your write-up should include a summary table for each spectrum. The summary table should include calculated H-H coupling constants for the methyl-methylene interaction for both spectra. In what ways are the spectra the same and have the same information? In what ways are they different?