1. Introduction

Homonuclear decoupling is essential for heteronuclear correlation experiments. Mutiple-pulse sequences such as WHH-4, MREV-8, BR-24, etc., are used for this purpose. However, applying multiple pulses on the decoupling channel while simultaneously acquiring data can be complicated. Tecmag's NMR instruments provide a convenient way to overcome this problem. Here we demonstrate with the WHH-4 decoupling sequence [1].

2. Pulse sequence

Figure 1a shows a cross-polarization (CP) sequence with ^{1}H WHH-4 decoupling. The "Asynchronous sequence" function is used to implement the WHH-4 decoupling scheme on lines F1_Ampl, F1_PhMod, F1_Attn, and F1_TXGate. As shown in Fig.1b, the data acquisition is turned on in event 7. THe "Asynchronous sequence" function calls for the WHH-4 decoupling sequence in enevts 5 - 7.

(a)

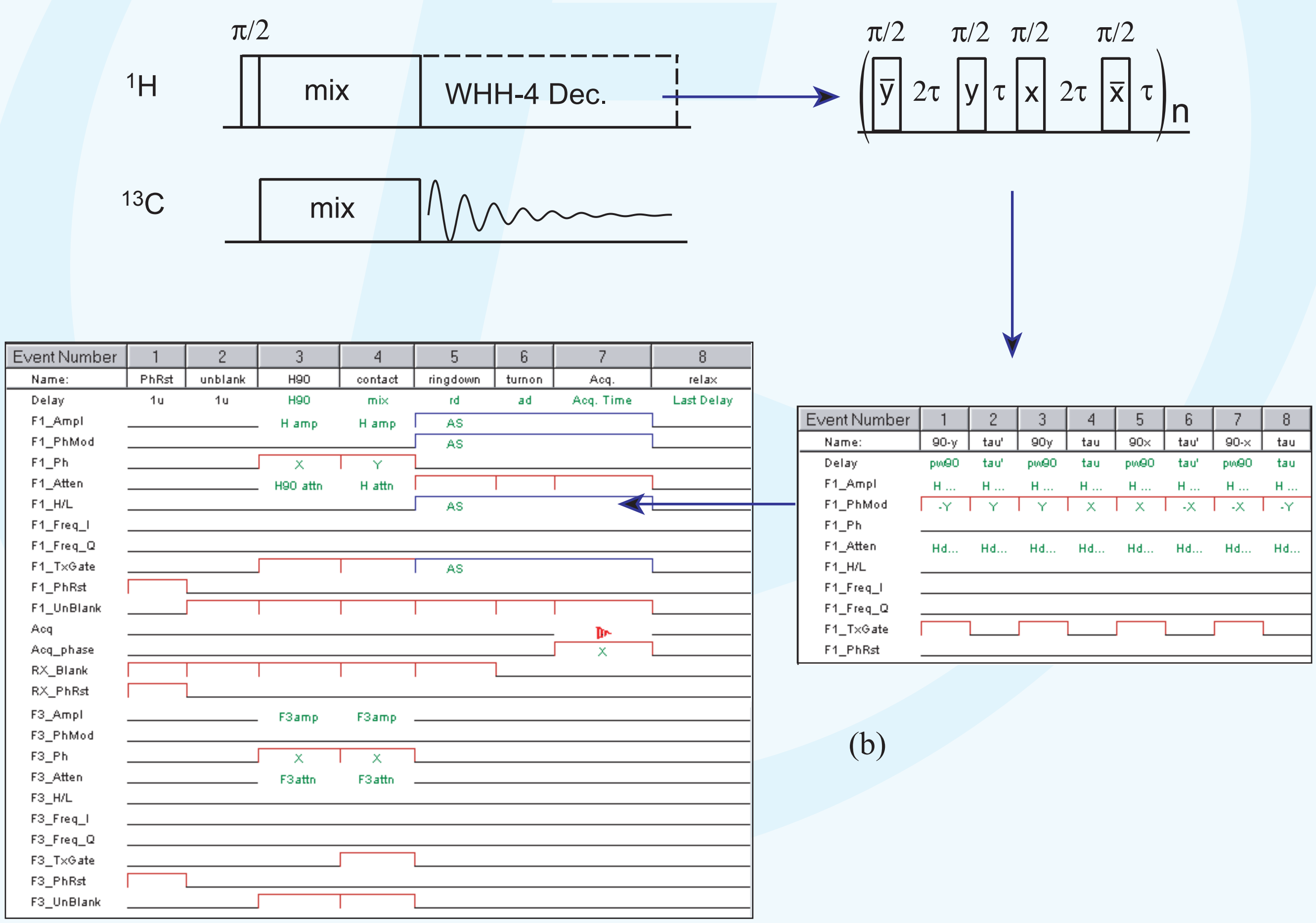
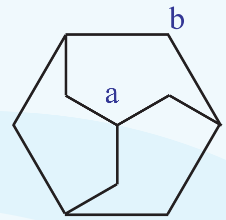


Fig. 1a: CP with WHH-4 proton decoupling pulse sequence. b: Actual sequence in the NTNMR sequence editor.

3. Experiment

Sample: Adamantane
^{1}H_90^o: 2.3 µs
Mixing *rf* field: 55 kHz
^{1}H decoupling: 108 kHz
Rotor speed: 8.1kHz
Magnet: 7 Tesla
Console: Discovery triple-resonance
Probe: Doty H/X/Y MAS probe



4. Results

The CPMAS spectrum with *cw* ^{1}H decoupling shows two peaks: the secondary carbon at lower, and the tertiary carbon at higher field (Fig. 2, top).

In the Fig. 2 bottom spectrum, the secondary carbon is split to a doublet and tertiary to a triplet. Thus, the H-H couplings are removed by the WHH-4 decoupling but C-H J-coupling remains in the spectrum. The J-couplings ~130 Hz after taking account of the scaling factor due to WHH-4 decoupling.

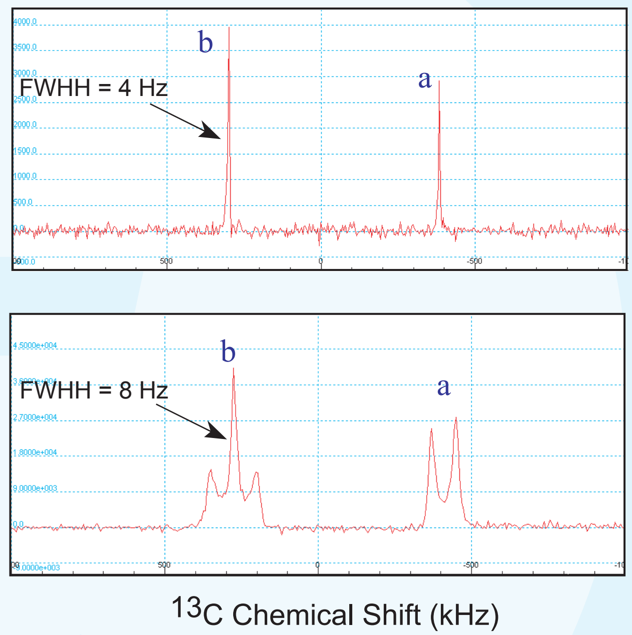


Fig. 2 Top: ^{13}C CPMAS spectrum of adamantane with cw ^{1}H decoupling. Bottom: ^{13}C CPMAS spectrum of adamantane with WAHUHA ^{1}H decoupling.

5. Reference

(1) Waugh, J. S., Huber, L. M., and Haeberlen, U. *Phys. Rev. Lett.* **20,** 180-345, 1968.