

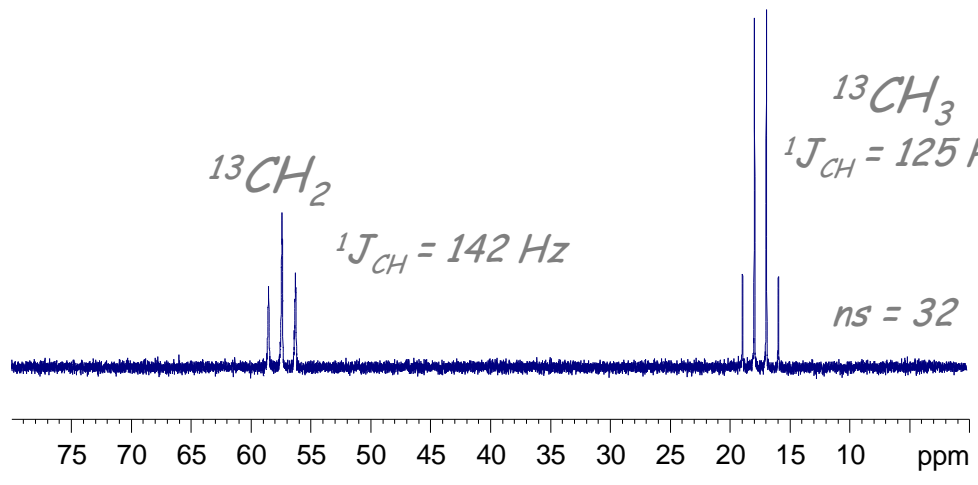
# Common Experiments

(sample: EtOH in D<sub>2</sub>O)

## direct excitation

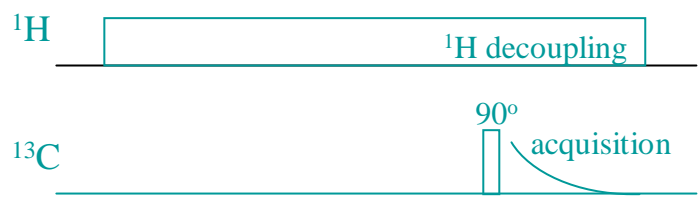


same pulse program used for <sup>1</sup>H NMR

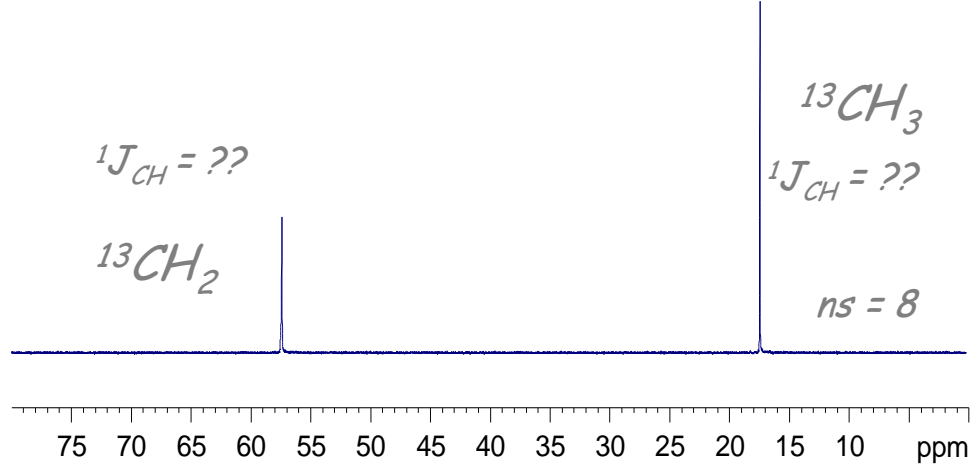


- What's measured?
- chemical shift
  - J-couplings
  - integration
  - expt ~ 5 minutes

## Powgate

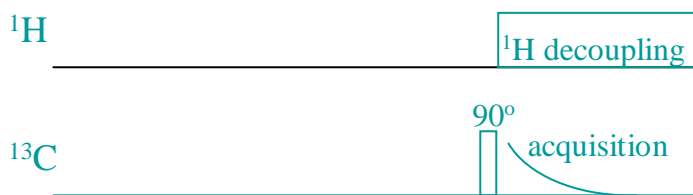


direct excitation with <sup>1</sup>H decoupling (power gated)  
(includes heteronuclear NOE)

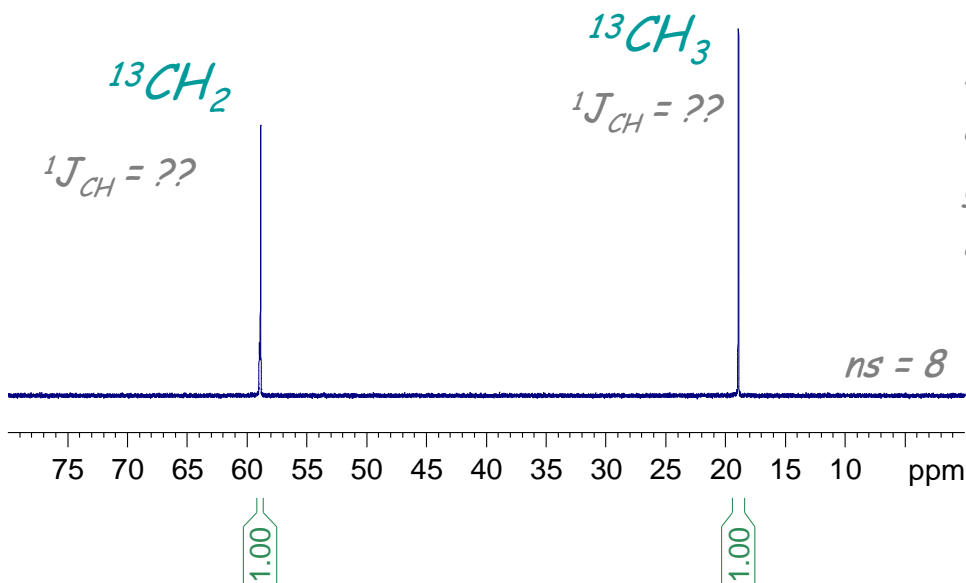


- higher resolution
- higher sensitivity
- not quantitative
- expt ~ 1 minute
- NOE enhancement =  $1 + \gamma_H/2\gamma_X$
- (for <sup>13</sup>C = 3)

# Invgate



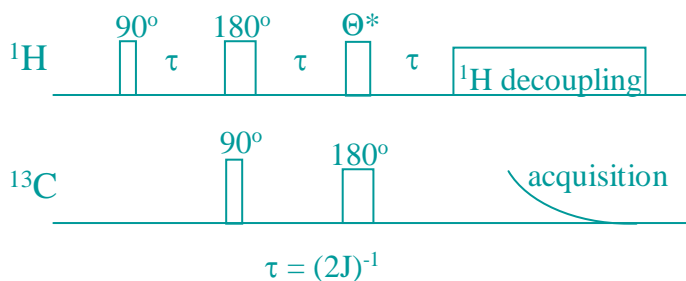
direct excitation with  $^1\text{H}$  decoupling during AQ only  
(no NOE)



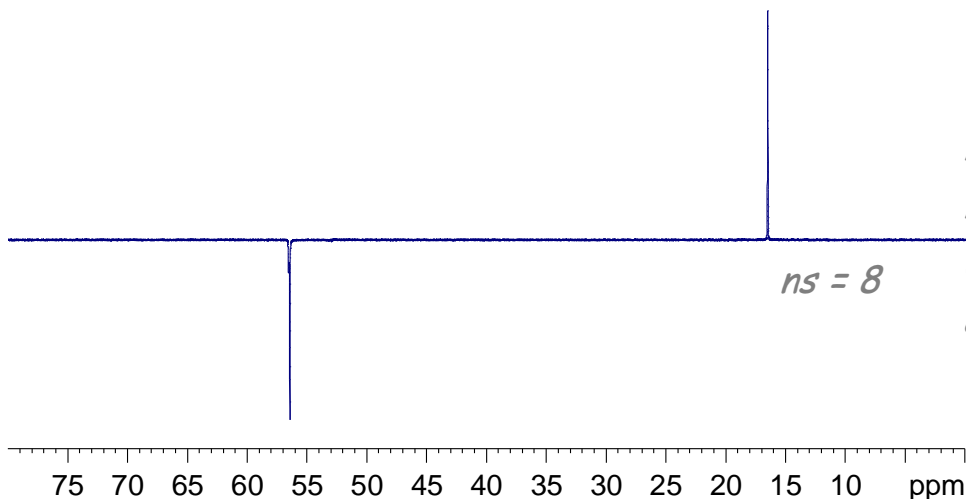
higher resolution  
quantitative **if**  $aq + d1 \geq 5 * T_1$   
good for quaternary carbons  
expt ~ 10 minutes

# DEPT

Distortionless  
Enhancement by  
Polarization Transfer



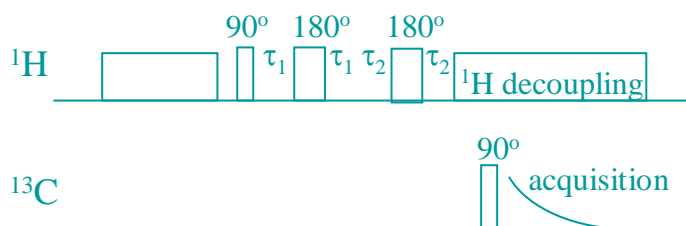
$\Theta^*$  = variable pulse angle  
90° phase shift



higher resolution  
higher sensitivity  
carbon assignments  
expt ~ 1 minute  
will not see quaternary carbons

# APT

Attached proton test



$^1J_{\text{CH}} = ??$



$^1J_{\text{CH}} = ??$

- higher resolution
- higher sensitivity
- carbon assignments
- expt ~ 1 minute
- includes quaternary carbons

ns = 8

