

2D Correlation of ^1H with ^{13}C

- HSQC / HMQC (Heteronuclear Single/Multiple Quantum Correlation) Is the Modern Experiment:
 - C-H J-Coupling Relationships
 - One Bond (Directly Attached C-H)
 - These One-Bond Couplings Are Large (~ 150 Hz)
 - ^1H Shift on Horizontal Axis (F_2)
 - ^{13}C Shift on Vertical Axis (F_1)
 - Quaternary Carbons Give no Crosspeak
 - Crosspeaks Appear As Wide Doublet in Horizontal Dimension ($^1J_{\text{CH}} \sim 150$ Hz)
 - Excellent Sensitivity (^1H Detected)
 - High Resolution in ^1H (Horizontal) Dimension
 - $^{12}\text{C-H}$ Proton Signal Must Be Suppressed
 - Inverse Probe (^1H Coil on Inside, ^{13}C Coil on Outside) Gives Best Results
- Improvements to HSQC Experiment:
 - ^{13}C Decoupling: Crosspeaks Are Singlets
 - Editing: CH, CH₃ Crosspeaks Positive; CH₂ Crosspeaks Negative (Like DEPT-135)