Carbon-13 NMR vs. $^1$H NMR

- Abundance ~1%, Frequency ~ ¼ of $^1$H
  Sensitivity = $1.76 \times 10^{-4}$ of $^1$H
- No $^{13}$C to $^{13}$C Splitting Due to Low Abundance ("Dilute Nucleus")
- Strong $^1$H to $^{13}$C Splitting (~150 Hz One-Bond, 0-10 Hz Two- or Three-Bond)
- Complexity of $^1$H to $^{13}$C Splitting Requires "Decoupling" of Protons
- This is Accomplished by Continuous RF Irradiation of Protons During the Acquisition of the $^{13}$C FID
- Carbon-13 is Relaxed by Nearby Protons, So Quaternary Carbons are Very Slow to Relax
- Peak Height (Intensity) is Dominated by Differences in Relaxation, so $^{13}$C Spectra Are Not Integrated