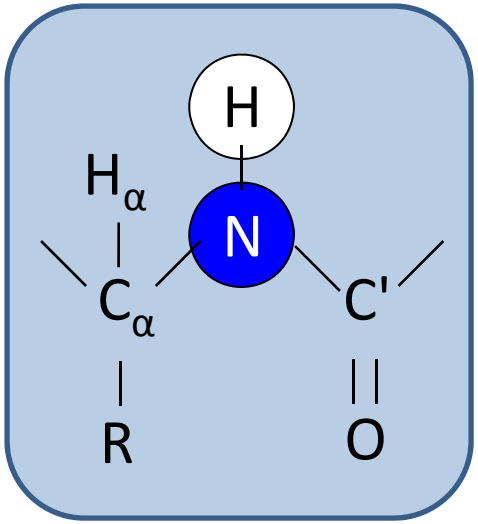
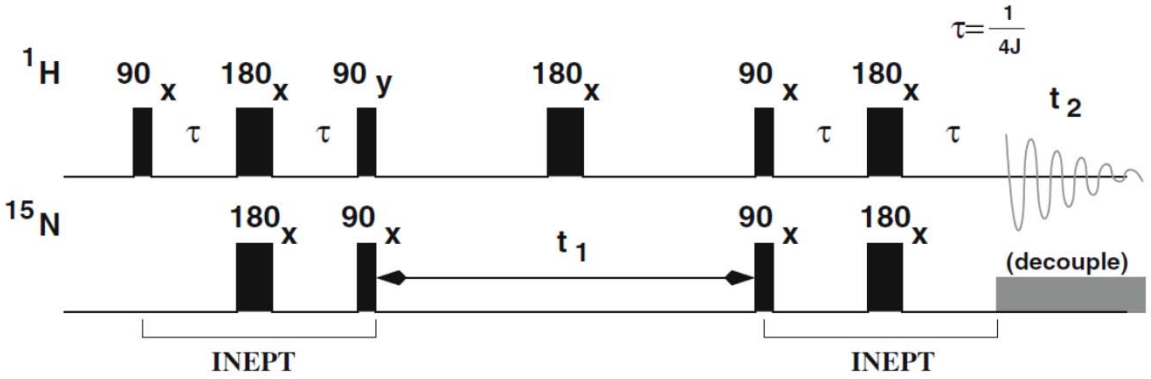
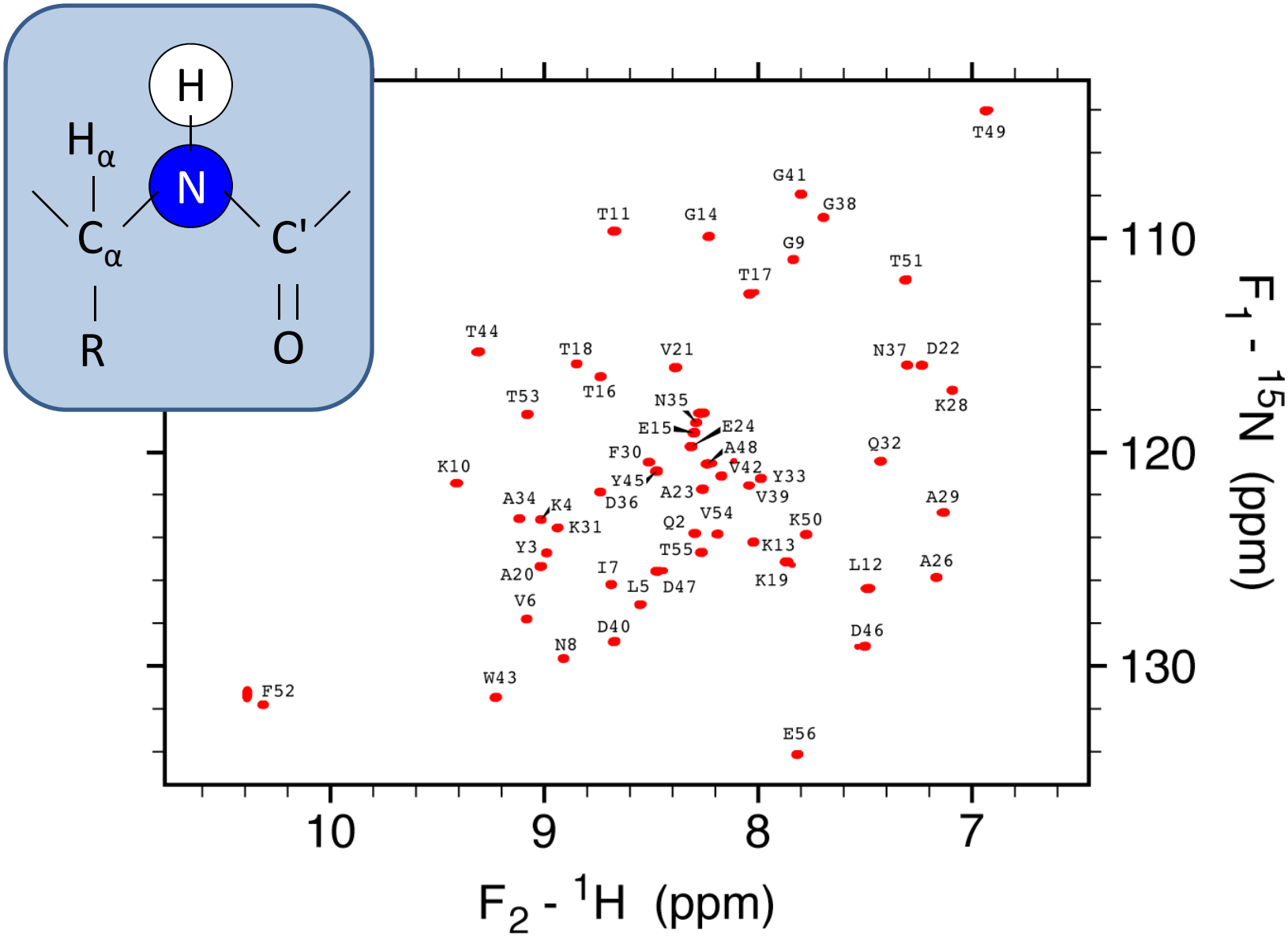
^{15}N HSQC



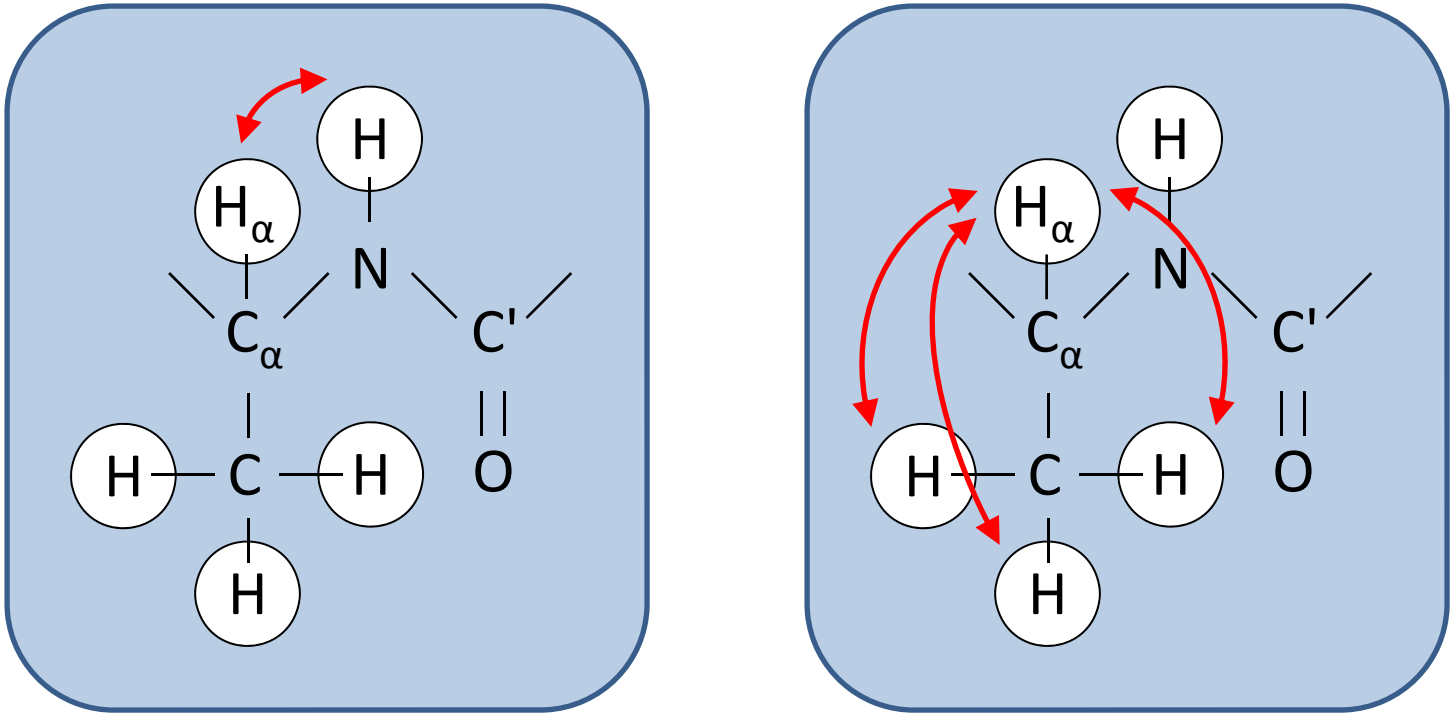


From *Fundamentals of Protein NMR Spectroscopy*
Rule & Hitchens, Chapt. 10, p. 205

2D ^{15}N HSQC: GB3

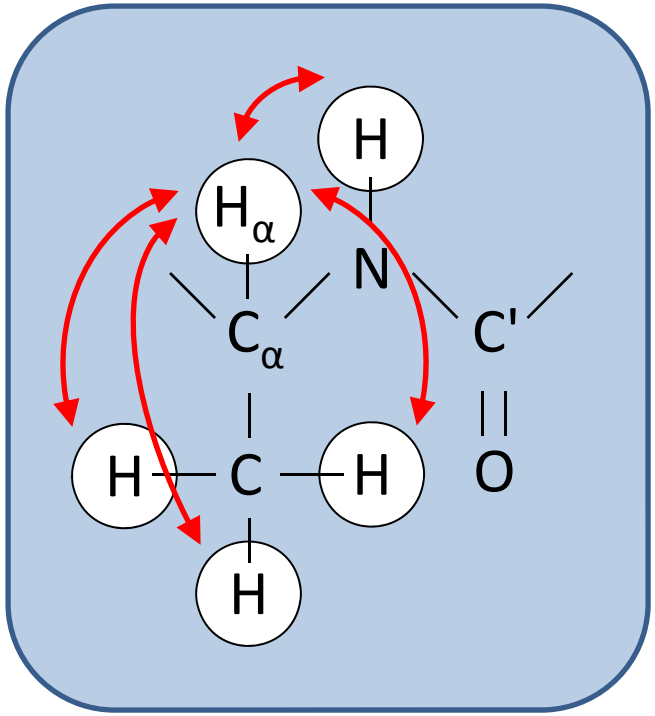


^{1}H COSY



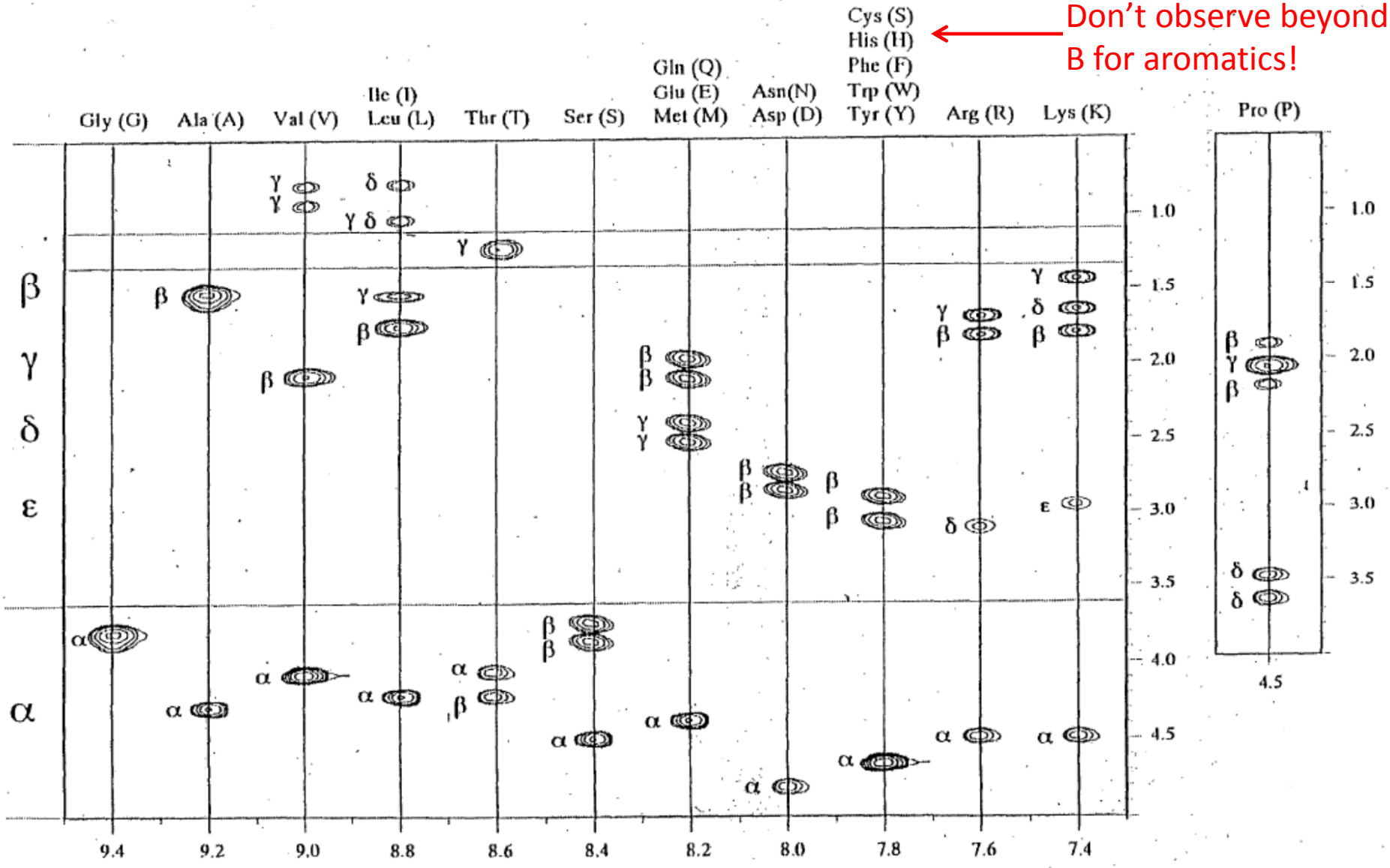
- Only one “hop” at a time between nuclei observed.
- Example: $H_N \leftrightarrow H_\alpha$, $H_\beta \leftrightarrow H_\alpha$ (but not both!)

^{1}H TOCSY



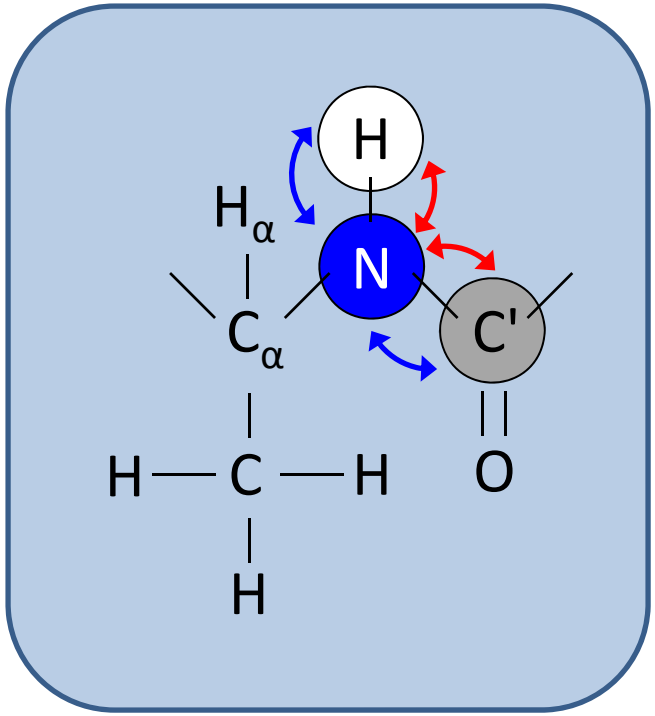
- Magnetization “hops” from nucleus to nucleus
- Example: Crosspeaks observed between H_N and: H_α, H_β, H_γ (gets weaker for more hops)

^{1}H TOCSY Fingerprints



Don't observe beyond B for aromatics!

3D HNCO



Out: Red transfers occur during preparation period

Back: Blue transfers occur between chemical shift labeling steps on the way back

- See peaks at H_N, N, and C'_{i-1} (i.e. the C' of the prior residue)
- Requires ^{13}C and ^{15}N labeled protein

Summary

- NOESY allows transfer of magnetization through space; distance geometry can reconstruct the structure
- COSY and TOCSY correlate homonuclear spins using J-coupling through one hop or multiple hops
- HSQC uses J-coupling to correlate bonded, heteronuclear spins
- HNCO transfers magnetization “out and back” to previous residue’s C’.
- Combining multidimensional experiments allows assignment of entire proteins