Advanced 1D Experiments

- Uses Selective (Shaped) Pulses to Excite One NMR Peak in the $^1$H Spectrum

- Gradients are Used in Conjunction with the Shaped Pulses to Give Very Clean Selectivity: DPFGSE

- The Excitation then Moves to Other Protons as Follows:
  - **By NOE**: a Through-Space Direct Interaction for All Protons Within 5 Å Distance of the Selected Proton (Efficiency Depends on $1/r^6$)
  - **By TOCSY**: a Through-Bond Connection Using the J Coupling – This is Repeated in Multiple Jumps (Efficiency of Each Jump Depends on $J$)

- The Proton Spectrum Shows the Original (Selected) Peak and Other Peaks Resulting from Transfer of Excitation – Peak Intensity Depends on Efficiency of Transfer