

# Two Kinds of Spin-Spin Coupling

- **Scalar or Through-Bond Coupling (J)**

Relatively Small:  $^1\text{H}$ - $^{15}\text{N}$  Coupling  $\sim 90$  Hz

Does Not Depend on Orientation of N-H

- **Dipolar or Through-Space Coupling (D)**

Very Large:  $^1\text{H}$ - $^{15}\text{N}$  Coupling 25,000 Hz

Depends on Orientation of N-H:  $3\cos^2\Theta - 1$

Averages to Zero for Rapid Isotropic Motion