

# NMR-Spektroskopie in der Anorganischen Chemie

diamagnetic	paramagnetic (hyperfine interaction)
Indirect <b>scalar coupling</b> ( $J$ ), <b>Fermi contact interaction</b> (in organic molecules 4-5 bonds)	<b>(Fermi) contact shift</b> ( $\delta^{cs}$ ), electron magnetic moment at location of nucleus, “through-bond”, short-range (5-6 bonds from paramagnetic center, except conjugated systems)
Direct (through space) <b>dipole-dipole coupling</b> , (distances in organic molecules within 4-5 Å, proportional $r^{-6}$ )	<b>Pseudocontact shift</b> ( $\delta^{pcs}$ ), long-range dipole-dipole coupling, “through-space”, like $\delta^{cs}$ independent of orientation of nucleus, not cancelled-out by molecular reorientation, adds up to isotropic dipolar shift (proportional $r^{-3}$ )