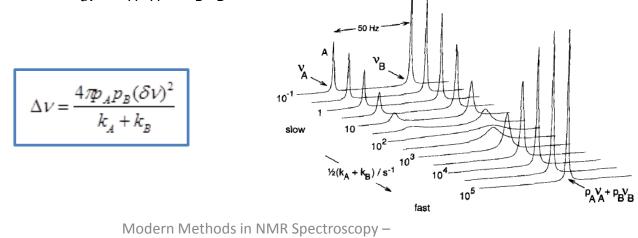
(6) Applications – digression into dynamics: lineshape

- Asymmetric two-side exchange for two, energetically nonidentical sites (populations in equilibrium  $p_A$  and  $p_B$ , with  $p_A + p_B = 1$ )
- Slow exchange:

$$\Delta \nu_A = \frac{k_A}{\pi} = \frac{1}{\pi \tau_A} \qquad \qquad \Delta \nu_B = \frac{k_B}{\pi} = \frac{1}{\pi \tau_B}$$

• Fast exchange: one line at weighed average of individual frequencies ( $v_{qv} = p_A v_A + p_B v_B$ )



Heteronuclei