

(6) Applications – digression into dynamics: lineshape

- **Asymmetric** two-side exchange for two, energetically non-identical sites (populations in equilibrium p_A and p_B , with $p_A + p_B = 1$)

- Slow exchange:

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

- Fast exchange: one line at weighed average of individual frequencies ($\nu_{av} = p_A\nu_A + p_B\nu_B$)

$$\Delta\nu = \frac{4p_A p_B (\delta\nu)^2}{k_A + k_B}$$

