

Measuring helicity structure

Three possibilities: (for $Q^2=0$)

$$\text{No-flip} \quad (A_{++} = A_{--}) \quad \gamma_T \rightarrow V_T$$

$$\text{Single-flip} \quad (A_{+0} = -A_{-0}) \quad \gamma_T \rightarrow V_L$$

$$\text{Double-flip} \quad (A_{+-} = A_{-+}) \quad \gamma_T \rightarrow V_T$$

→ No-flip and double-flip
look the same in experiment!

VM are measured by their decay products

$$\rho^0 \rightarrow \pi^+ \pi^- \quad \phi \rightarrow K^+ K^- \quad J/\psi \rightarrow l^+ l^-$$

→ Enter the spin-density matrix elements $\rho_{\lambda\lambda'}$ parametrizing the decay angular distributions

$$\left\{ \begin{array}{l} \rho(V) = A \rho(\gamma) A^\dagger \\ \frac{dN}{d\cos\theta d\varphi} = M \rho(V) M^\dagger \end{array} \right. \quad \begin{array}{l} A = \text{production ampl.} \\ M = \text{decay ampl.} \end{array}$$

[Schilling, Seyboth & Wolf]