

7
Observables are written as a sum of **bilinear products** of $\langle \alpha \beta | J^a | \sigma \rangle \langle \alpha' \beta' | J^b | \sigma' \rangle^*$

The scattering process is completely described by the scattering amplitudes

HOW MANY AMPLITUDES?

$$N = \prod_{i=1}^n (2S_i + 1)$$

n = particles with an intrinsic spin $S_i \neq 0$

The process under investigation is:

$$\delta_{\text{virtual}} + A \rightarrow p' + B$$

$$N = \underset{\substack{\uparrow \\ S_A=1}}{3} \cdot \underset{\substack{\uparrow \\ S_{p'}=1/2}}{2} \cdot (2S_A+1) \cdot (2S_{B+1}+1)$$

HOW MANY REAL PARAMETERS?

N

/2 INDEPENDENT AMPLITUDES (PARITY CONSERVATION)
* 2 (AMPLITUDES ARE COMPLEX QUANTITIES!)

$N - 1$ REAL PARAMETERS!

\uparrow
overall phase undetermined