

$$w_{12\rightarrow 34}(\vec{p}_1, \vec{k}) = \gamma_2 \int \frac{d^3 p_2}{(2\pi)^3} f_2(\vec{p}_2) \left[1 \pm f_3(\vec{p}_1 - \vec{k}) \right] \left[1 \pm f_4(\vec{p}_2 + \vec{k}) \right]$$

$$\times v_{\text{rel}} d\sigma_{12\rightarrow 34}(\vec{p}_1, \vec{p}_2 \rightarrow \vec{p}_1 - \vec{k}, \vec{p}_2 + \vec{k})$$