

Field kinematics

| Basic conventions | | | | |
|-------------------------|-------------------------------|----------|------------------------|----------------------------|
| Minkowski metric tensor | Totally antisymmetric tensor | Momentum | Norm | Frame |
| $\eta_{\mu\nu}$ | $\in \eta_{\mu\nu\rho\sigma}$ | k^μ | $k^2 == k_\mu \ k^\mu$ | $n^\mu == \frac{k^\mu}{k}$ |

Fundamental fields

| Fundamental field | Symmetries | Decomposition in SO(3) irreps | Source |
|----------------------------|--|---|----------------------------|
| $\omega_{\alpha\beta\chi}$ | Symmetry[3, $\omega^{\bullet 1\bullet 2\bullet 3}$, { $\bullet 1 \rightarrow$ -a, $\bullet 2 \rightarrow$ -b, $\bullet 3 \rightarrow$ -c}, StrongGenSet[{1, 2}, GenSet[-(1,2)]]] | $-\frac{1}{2} \ \eta_{\beta\chi} \ \omega_{1^- \ \alpha}^{\#1} + \frac{1}{2} \ \eta_{\alpha\chi} \ \omega_{1^- \ \beta}^{\#1} + \frac{4}{3} \ \omega_{2^- \ \alpha\beta\chi}^{\#1} + \frac{1}{3} \ \eta_{\beta\chi} \ \omega_{0^+}^{\#1} \ n_\alpha + \omega_{1^+ \ \beta\chi}^{\#1} \ n_\alpha + \omega_{2^+ \ \beta\chi}^{\#1} \ n_\alpha - \frac{1}{3} \ \eta_{\alpha\chi} \ \omega_{0^+}^{\#1} \ n_\beta -$ $\omega_{1^+ \ \alpha\chi}^{\#1} \ n_\beta - \omega_{2^+ \ \alpha\chi}^{\#1} \ n_\beta + \omega_{1^+ \ \alpha\beta}^{\#2} \ n_\chi - \frac{1}{2} \ \omega_{1^- \ \beta}^{\#1} \ n_\alpha \ n_\chi - \omega_{1^- \ \beta}^{\#2} \ n_\alpha \ n_\chi + \frac{1}{2} \ \omega_{1^- \ \alpha}^{\#1} \ n_\beta \ n_\chi + \omega_{1^- \ \alpha}^{\#2} \ n_\beta \ n_\chi - \frac{1}{6} \ \in \eta_{\alpha\beta\chi\delta} \ \omega_{0^-}^{\#1} \ n^\delta$ | $\sigma_{\alpha\beta\chi}$ |

SO(3) irreps

| SO(3) irrep | Symmetries | Expansion in terms of the fundamental field | Source |
|--|---|--|--|
| $\omega_{0^+}^{\#1}$ | Symmetry[0, $\omega_{0^+}^{\#1}$, {}, StrongGenSet[{}, GenSet[]]] | $\omega_\alpha^\beta \ n^\alpha$ | $\sigma_{0^+}^{\#1}$ |
| $\omega_{0^-}^{\#1}$ | Symmetry[0, $\omega_{0^-}^{\#1}$, {}, StrongGenSet[{}, GenSet[]]] | $- \in \eta_{\alpha\beta\chi\delta} \ \omega^{\beta\chi\delta} \ n^\alpha$ | $\sigma_{0^-}^{\#1}$ |
| $\omega_{1^+ \ \alpha\beta}^{\#1}$ | Symmetry[2, $\omega_{1^+}^{\#1\bullet 1\bullet 2}$, { $\bullet 1 \rightarrow$ -a, $\bullet 2 \rightarrow$ -b}, StrongGenSet[{1, 2}, GenSet[-(1,2)]]] | $-\frac{1}{2} \ \omega_{\alpha\chi\beta} \ n^\chi + \frac{1}{2} \ \omega_{\beta\chi\alpha} \ n^\chi - \frac{1}{2} \ \omega_{\beta\chi\delta} \ n_\alpha \ n^\chi \ n^\delta + \frac{1}{2} \ \omega_{\alpha\chi\delta} \ n_\beta \ n^\chi \ n^\delta$ | $\sigma_{1^+ \ \alpha\beta}^{\#1}$ |
| $\omega_{1^+ \ \alpha\beta}^{\#2}$ | Symmetry[2, $\omega_{1^+}^{\#2\bullet 1\bullet 2}$, { $\bullet 1 \rightarrow$ -a, $\bullet 2 \rightarrow$ -b}, StrongGenSet[{1, 2}, GenSet[-(1,2)]]] | $\omega_{\alpha\beta\chi} \ n^\chi + \omega_{\beta\chi\delta} \ n_\alpha \ n^\chi \ n^\delta - \omega_{\alpha\chi\delta} \ n_\beta \ n^\chi \ n^\delta$ | $\sigma_{1^+ \ \alpha\beta}^{\#2}$ |
| $\omega_{1^- \ \alpha}^{\#1}$ | Symmetry[1, $\omega_{1^-}^{\#1\bullet 1}$, { $\bullet 1 \rightarrow$ -a}, StrongGenSet[{}, GenSet[]]] | $- \omega_\alpha^\beta \ n_\beta + \omega_\beta^\chi \ n_\chi \ n_\alpha \ n^\beta + \omega_{\alpha\beta\chi} \ n^\beta \ n^\chi$ | $\sigma_{1^- \ \alpha}^{\#1}$ |
| $\omega_{1^- \ \alpha}^{\#2}$ | Symmetry[1, $\omega_{1^-}^{\#2\bullet 1}$, { $\bullet 1 \rightarrow$ -a}, StrongGenSet[{}, GenSet[]]] | $\omega_{\alpha\beta\chi} \ n^\beta \ n^\chi$ | $\sigma_{1^- \ \alpha}^{\#2}$ |
| $\omega_{2^+ \ \alpha\beta}^{\#1}$ | Symmetry[2, $\omega_{2^+}^{\#1\bullet 1\bullet 2}$, { $\bullet 1 \rightarrow$ -a, $\bullet 2 \rightarrow$ -b}, StrongGenSet[{1, 2}, GenSet[(1,2)]]] | $-\frac{1}{2} \ \omega_{\alpha\chi\beta} \ n^\chi - \frac{1}{2} \ \omega_{\beta\chi\alpha} \ n^\chi - \frac{1}{3} \ \eta_{\alpha\beta} \ \omega_\chi^\delta \ n^\chi + \frac{1}{3} \ \omega_\chi^\delta \ n_\alpha \ n_\beta \ n^\chi + \frac{1}{2} \ \omega_{\beta\chi\delta} \ n_\alpha \ n^\chi \ n^\delta + \frac{1}{2} \ \omega_{\alpha\chi\delta} \ n_\beta \ n^\chi \ n^\delta$ | $\sigma_{2^+ \ \alpha\beta}^{\#1}$ |
| $\omega_{2^- \ \alpha\beta\chi}^{\#1}$ | Symmetry[3, $\omega_{2^-}^{\#1\bullet 1\bullet 2\bullet 3}$, { $\bullet 1 \rightarrow$ -a, $\bullet 2 \rightarrow$ -b, $\bullet 3 \rightarrow$ -c}, StrongGenSet[{1, 2}, GenSet[-(1,2)]]] | $\frac{1}{2} \ \omega_{\alpha\beta\chi} + \frac{1}{4} \ \omega_{\alpha\chi\beta} - \frac{3}{8} \ \eta_{\beta\chi} \ \omega_\alpha^\delta \ n^\delta - \frac{1}{4} \ \omega_{\beta\chi\alpha} + \frac{3}{8} \ \eta_{\alpha\chi} \ \omega_\beta^\delta \ n^\delta - \frac{3}{8} \ \omega_\beta^\delta \ n_\alpha \ n_\chi + \frac{3}{8} \ \omega_\alpha^\delta \ n_\beta \ n_\chi + \frac{1}{4} \ \omega_{\beta\chi\delta} \ n_\alpha \ n^\delta +$ $\frac{1}{2} \ \omega_{\beta\delta\chi} \ n_\alpha \ n^\delta + \frac{1}{4} \ \omega_{\chi\delta\beta} \ n_\alpha \ n^\delta + \frac{3}{8} \ \eta_{\beta\chi} \ \omega_\delta^\epsilon \ n_\alpha \ n^\delta - \frac{1}{4} \ \omega_{\alpha\chi\delta} \ n_\beta \ n^\delta - \frac{1}{2} \ \omega_{\alpha\delta\chi} \ n_\beta \ n^\delta - \frac{1}{4} \ \omega_{\chi\delta\alpha} \ n_\beta \ n^\delta - \frac{3}{8} \ \eta_{\alpha\chi} \ \omega_\delta^\epsilon \ n_\beta \ n^\delta -$ $\frac{1}{2} \ \omega_{\alpha\beta\delta} \ n_\chi \ n^\delta - \frac{1}{4} \ \omega_{\alpha\delta\beta} \ n_\chi \ n^\delta + \frac{1}{4} \ \omega_{\beta\delta\alpha} \ n_\chi \ n^\delta + \frac{3}{8} \ \eta_{\beta\chi} \ \omega_{\alpha\delta\epsilon} \ n^\delta \ n^\epsilon - \frac{3}{8} \ \eta_{\alpha\chi} \ \omega_{\beta\delta\epsilon} \ n^\delta \ n^\epsilon + \frac{3}{8} \ \omega_{\alpha\delta\epsilon} \ n_\beta \ n_\chi \ n^\delta \ n^\epsilon$ | $\sigma_{2^- \ \alpha\beta\chi}^{\#1}$ |