Field kinematics

Basic conventions

Minkowski metric tensor	Totally antisymmetric tensor	Momentum	Norm	Frame
$\eta_{\mu\nu}$	$\epsilon\eta_{\mu\nu\rho\sigma}$	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, $\omega^{\bullet 1\bullet 2\bullet 3}$, {$\bullet 1 \to$ -a, $\bullet 2 \to$ -b, $\bullet 3 \to$ -c}, StrongGenSet[{1, 2}, GenSet[-(1,2)]]]	$-\frac{1}{2}\ \eta_{\beta\chi}\ \omega_{1^-}^{\#1}{}_{\alpha} + \frac{1}{2}\ \eta_{\alpha\chi}\ \omega_{1^-}^{\#1}{}_{\beta} + \frac{4}{3}\ \omega_{2^-}^{\#1}{}_{\alpha\beta\chi} + \frac{1}{3}\ \eta_{\beta\chi}\ \omega_{0^+}^{\#1}\ n_{\alpha} + \omega_{1^+}^{\#1}{}_{\beta\chi}\ n_{\alpha} + \omega_{2^+}^{\#1}{}_{\beta\chi}\ n_{\alpha} - \frac{1}{3}\ \eta_{\alpha\chi}\ \omega_{0^+}^{\#1}\ n_{\beta} - \omega_{1^+}^{\#1}{}_{\alpha\chi}\ n_{\beta} - \omega_{2^+}^{\#1}{}_{\alpha\chi}\ n_{\beta} + \omega_{1^+}^{\#1}{}_{\alpha\beta}\ n_{\chi} - \frac{1}{2}\ \omega_{1^-}^{\#1}{}_{\beta}\ n_{\alpha}\ n_{\chi} - \omega_{1^-}^{\#2}{}_{\beta}\ n_{\alpha}\ n_{\chi} + \frac{1}{2}\ \omega_{1^-}^{\#1}{}_{\alpha}\ n_{\beta}\ n_{\chi} + \omega_{1^-}^{\#2}{}_{\alpha}\ n_{\beta}\ n_{\chi} - \frac{1}{6}\ \epsilon\eta_{\alpha\beta\chi\delta}\ \omega_{0^-}^{\#1}\ n^{\delta}$	$\sigma_{\alpha\beta\chi}$

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[]]]	$\omega_{\alpha}{}^{\beta}{}_{\beta}\ n^{\alpha}$	$\sigma_{0^+}^{\#1}$
$\omega_{0^-}^{\#1}$	Symmetry[0, $\omega_{0^-}^{\#1}$, {}, StrongGenSet[{}, GenSet[]]]	$-\epsilon\eta_{\alpha\beta\chi\delta}\ \omega^{\beta\chi\delta}\ n^{\alpha}$	$\sigma_{0^-}^{\#1}$
$\omega_{1^+}^{\#1}{}_{\alpha\beta}$	Symmetry[2, $\omega_{1^+}^{\#1\bullet 1\bullet 2}$, {$\bullet 1 \to$ -a, $\bullet 2 \to$ -b}, StrongGenSet[{1, 2}, GenSet[-(1,2)]]]	$-\frac{1}{2}\ \omega_{\alpha\chi\beta}\ n^{\chi} + \frac{1}{2}\ \omega_{\beta\chi\alpha}\ n^{\chi} - \frac{1}{2}\ \omega_{\beta\chi\delta}\ n_{\alpha}\ n^{\chi}\ n^{\delta} + \frac{1}{2}\ \omega_{\alpha\chi\delta}\ n_{\beta}\ n^{\chi}\ n^{\delta}$	$\sigma_{1^+}^{\#1}{}_{\alpha\beta}$
$\omega_{1^+}^{\#2}{}_{\alpha\beta}$	Symmetry[2, $\omega_{1^+}^{\#2\bullet 1\bullet 2}$, {$\bullet 1 \to$ -a, $\bullet 2 \to$ -b}, StrongGenSet[{1, 2}, GenSet[-(1,2)]]]	$\omega_{\alpha\beta\chi}\ n^{\chi} + \omega_{\beta\chi\delta}\ n_{\alpha}\ n^{\chi}\ n^{\delta} - \omega_{\alpha\chi\delta}\ n_{\beta}\ n^{\chi}\ n^{\delta}$	$\sigma_{1^+}^{\#2}{}_{\alpha\beta}$
$\omega_{1^-}^{\#1}{}_{\alpha}$	Symmetry[1, $\omega_{1^-}^{\#1\bullet 1}$, {$\bullet 1 \to$ -a}, StrongGenSet[{}, GenSet[]]]	$-\omega_{\alpha}{}^{\beta}{}_{\beta} + \omega_{\beta}{}^{\chi}{}_{\chi}\ n_{\alpha}\ n^{\beta} + \omega_{\alpha\beta\chi}\ n^{\beta}\ n^{\chi}$	$\sigma_{1^-}^{\#1}{}_{\alpha}$
$\omega_{1^-}^{\#2}{}_{\alpha}$	Symmetry[1, $\omega_{1^-}^{\#2\bullet 1}$, {$\bullet 1 \to$ -a}, StrongGenSet[{}, GenSet[]]]	$\omega_{\alpha\beta\chi}\ n^{\beta}\ n^{\chi}$	$\sigma_{1^-}^{\#2}{}_{\alpha}$
$\omega_{2^+}^{\#1}{}_{\alpha\beta}$	Symmetry[2, $\omega_{2^+}^{\#1\bullet 1\bullet 2}$, {$\bullet 1 \to$ -a, $\bullet 2 \to$ -b}, StrongGenSet[{1, 2}, GenSet[(1,2)]]]	$-\frac{1}{2}\ \omega_{\alpha\chi\beta}\ n^{\chi} - \frac{1}{2}\ \omega_{\beta\chi\alpha}\ n^{\chi} - \frac{1}{3}\ \eta_{\alpha\beta}\ \omega_{\chi}{}^{\delta}{}_{\delta}\ n^{\chi} + \frac{1}{3}\ \omega_{\chi}{}^{\delta}{}_{\delta}\ n_{\alpha}\ n_{\beta}\ n^{\chi} + \frac{1}{2}\ \omega_{\beta\chi\delta}\ n_{\alpha}\ n^{\chi}\ n^{\delta} + \frac{1}{2}\ \omega_{\alpha\chi\delta}\ n_{\beta}\ n^{\chi}\ n^{\delta}$	$\sigma_{2^+}^{\#1}{}_{\alpha\beta}$
$\omega_{2^-}^{\#1}{}_{\alpha\beta\chi}$	Symmetry[3, $\omega_{2^-}^{\#1\bullet 1\bullet 2\bullet 3}$, {$\bullet 1 \to$ -a, $\bullet 2 \to$ -b, $\bullet 3 \to$ -c}, StrongGenSet[{1, 2}, GenSet[-(1,2)]]]	$\frac{1}{2}\ \omega_{\alpha\beta\chi} + \frac{1}{4}\ \omega_{\alpha\chi\beta} - \frac{3}{8}\ \eta_{\beta\chi}\ \omega_{\alpha}{}^{\delta}{}_{\delta} - \frac{1}{4}\ \omega_{\beta\chi\alpha} + \frac{3}{8}\ \eta_{\alpha\chi}\ \omega_{\beta}{}^{\delta}{}_{\delta} - \frac{3}{8}\ \omega_{\beta}{}^{\delta}{}_{\delta}\ n_{\alpha}\ n_{\chi} + \frac{3}{8}\ \omega_{\alpha}{}^{\delta}{}_{\delta}\ n_{\beta}\ n_{\chi} + \frac{1}{4}\ \omega_{\beta\chi\delta}\ n_{\alpha}\ n^{\delta} + \frac{1}{2}\ \omega_{\beta\delta\chi}\ n_{\alpha}\ n^{\delta} + \frac{1}{4}\ \omega_{\chi\delta\beta}\ n_{\alpha}\ n^{\delta} + \frac{3}{8}\ \eta_{\beta\chi}\ \omega_{\delta}{}^{\epsilon}{}_{\epsilon}\ n_{\alpha}\ n^{\delta} - \frac{1}{4}\ \omega_{\alpha\chi\delta}\ n_{\beta}\ n^{\delta} - \frac{1}{2}\ \omega_{\alpha\delta\chi}\ n_{\beta}\ n^{\delta} - \frac{1}{4}\ \omega_{\chi\delta\alpha}\ n_{\beta}\ n^{\delta} - \frac{3}{8}\ \eta_{\alpha\chi}\ \omega_{\delta}{}^{\epsilon}{}_{\epsilon}\ n_{\beta}\ n^{\delta} - \frac{1}{2}\ \omega_{\alpha\beta\delta}\ n_{\chi}\ n^{\delta} - \frac{1}{4}\ \omega_{\alpha\delta\beta}\ n_{\chi}\ n^{\delta} + \frac{1}{4}\ \omega_{\beta\delta\alpha}\ n_{\chi}\ n^{\delta} + \frac{3}{8}\ \eta_{\beta\chi}\ \omega_{\alpha\delta\epsilon}\ n^{\delta}\ n^{\epsilon} - \frac{3}{8}\ \eta_{\alpha\chi}\ \omega_{\beta\delta\epsilon}\ n^{\delta}\ n^{\epsilon} - \frac{3}{8}\ \omega_{\beta\delta\epsilon}\ n_{\alpha}\ n_{\chi}\ n^{\delta}\ n^{\epsilon} + \frac{3}{8}\ \omega_{\alpha\delta\epsilon}\ n_{\beta}\ n_{\chi}\ n^{\delta}\ n^{\epsilon}$	$\sigma_{2^-}^{\#1}{}_{\alpha\beta\chi}$