

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, $\omega^{\bullet1\bullet2\bullet3}$, { ● 1 → -a, ● 2 → -b, ● 3 → -c}, StrongGenSet[{1, 2}, GenSet[-(1,2)]]]	$-\frac{1}{2}\ \eta_{\beta\chi}\ \omega_{1^-}^{\#1}\alpha + \frac{1}{2}\ \eta_{\alpha\chi}\ \omega_{1^-}^{\#1}\beta + \frac{4}{3}\ \omega_{2^-}^{\#1}\alpha\beta\chi + \frac{1}{3}\ \eta_{\beta\chi}\ \omega_{0^+}^{\#1}\ n_\alpha + \omega_{1^+}^{\#1}\beta\chi\ n_\alpha + \omega_{2^+}^{\#1}\beta\chi\ n_\alpha - \frac{1}{3}\ \eta_{\alpha\chi}\ \omega_{0^+}^{\#1}\ n_\beta - \omega_{1^+}^{\#1}\alpha\chi\ n_\beta - \omega_{2^+}^{\#1}\alpha\chi\ n_\beta + \omega_{1^+}^{\#2}\alpha\beta\ n_\chi - \frac{1}{2}\ \omega_{1^-}^{\#1}\beta\ n_\alpha\ n_\chi - \omega_{1^-}^{\#2}\beta\ n_\alpha\ n_\chi + \frac{1}{2}\ \omega_{1^-}^{\#1}\alpha\ n_\beta\ n_\chi + \omega_{1^-}^{\#2}\alpha\ n_\beta\ n_\chi - \frac{1}{6}\ \epsilon\eta_{\alpha\beta\chi\delta}\ \omega_0^{\#1}\ n^\delta$	$\sigma_{\alpha\beta\chi}$

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, $\omega_{1^+}^{\#1\bullet1\bullet2}$, { ● 1 → -a, ● 2 → -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, $\omega_{1^+}^{\#2\bullet1\bullet2}$, { ● 1 → -a, ● 2 → -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, $\omega_{1^-}^{\#1\bullet1}$, { ● 1 → -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, $\omega_{1^-}^{\#2\bullet1}$, { ● 1 → -a}, StrongGenSet[{}, GenSet[]]]	$\omega_{\alpha\beta\chi}\ n^\beta\ n^\chi$	$\sigma_{1^-}^{\#2}\alpha$
$\omega_{2^+}^{\#1}\alpha\beta$	Symmetry[2, $\omega_{2^+}^{\#1\bullet1\bullet2}$, { ● 1 → -a, ● 2 → -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, $\omega_{2^-}^{\#1\bullet1\bullet2\bullet3}$, { ● 1 → -a, ● 2 → -b, ● 3 → -c}, StrongGenSet[{1, 2}, GenSet[-(1,2)]]]	$\frac{1}{2}\ \omega_{\alpha\beta\chi} + \frac{1}{4}\ \omega_{\alpha\chi\beta} - \frac{3}{8}\ \eta_{\beta\chi}\ \omega_\alpha^\delta\ \delta - \frac{1}{4}\ \omega_{\beta\chi\alpha} + \frac{3}{8}\ \eta_{\alpha\chi}\ \omega_\beta^\delta\ \delta - \frac{3}{8}\ \omega_\beta^\delta\ \delta\ n_\alpha\ n_\chi + \frac{3}{8}\ \omega_\alpha^\delta\ \delta\ n_\beta\ n_\chi + \frac{1}{4}\ \omega_{\beta\chi\delta}\ n_\alpha\ n^\delta + \frac{1}{2}\ \omega_{\beta\delta\chi}\ n_\alpha\ n^\delta + \frac{1}{4}\ \omega_{\chi\delta\beta}\ n_\alpha\ n^\delta + \frac{3}{8}\ \eta_{\beta\chi}\ \omega_\delta^\epsilon\ \epsilon\ n_\alpha\ n^\delta - \frac{1}{4}\ \omega_{\alpha\chi\delta}\ n_\beta\ n^\delta - \frac{1}{4}\ \omega_{\chi\delta\alpha}\ n_\beta\ n^\delta - \frac{3}{8}\ \eta_{\alpha\chi}\ \omega_\delta^\epsilon\ \epsilon\ n_\beta\ n^\delta - \frac{1}{2}\ \omega_{\alpha\beta\delta}\ n_\chi\ n^\delta - \frac{1}{4}\ \omega_{\alpha\delta\beta}\ n_\chi\ n^\delta + \frac{1}{4}\ \omega_{\beta\delta\alpha}\ n_\chi\ n^\delta + \frac{3}{8}\ \eta_{\beta\chi}\ \omega_{\alpha\delta\epsilon}\ n^\delta\ n^\epsilon - \frac{3}{8}\ \eta_{\alpha\chi}\ \omega_{\beta\delta\epsilon}\ n^\delta\ n^\epsilon - \frac{3}{8}\ \omega_{\beta\delta\epsilon}\ n_\alpha\ n_\chi\ n^\delta\ n^\epsilon + \frac{3}{8}\ \omega_{\alpha\delta\epsilon}\ n_\beta\ n_\chi\ n^\delta\ n^\epsilon$	$\sigma_{2^-}^{\#1}\alpha\beta\chi$