

$$\text{LHS}_{z \nu} = \text{L}_z^z \nu$$

$$\underbrace{\text{L} \text{ } \nu \text{ } \text{L}}_{\text{L} \times \text{L}} \times \underbrace{\text{L} \text{ } \nu \text{ } \text{L}}_{\text{L} \times \text{L}} = \underbrace{\text{L} \text{ } \nu \text{ } \text{L}}_{\text{L}}$$

$$\begin{aligned} \text{LHS}_{z \nu} &= \text{L}_z^z \nu \underbrace{\text{L} \text{ } \nu \text{ } \text{L}}_{z \nu} - \text{L}_z^z \nu \underbrace{\text{L} \text{ } \nu \text{ } \text{L}}_{z \nu} = \text{L}_z^z \nu \overbrace{\text{L} \text{ } \nu \text{ } \text{L}}^{\text{L} \times \text{L} \times \text{L}} - \text{L}_z^z \nu \overbrace{\text{L} \text{ } \nu \text{ } \text{L}}^{\text{L} \times \text{L} \times \text{L}} \\ &= \text{L}_z^z \underbrace{\text{L} \sim \text{L}}_{z \sim z} - \text{L}_z^z \underbrace{\text{L} \sim \text{L}}_{z \sim z} = \text{L}_z^z \text{L}_z^z \nu + \text{L}_z^z \text{L}_z^z \nu - \text{L}_z^z \text{L}_z^z \nu - \text{L}_z^z \text{L}_z^z \nu = \text{RHS}_{z \nu} \end{aligned}$$