

$$\Delta_{3^{-}}^{\#1} \dagger^{\alpha\beta\chi} \Delta_{3^{-}}^{\#1} \alpha\beta\chi = -\frac{2}{a_0}$$

$$\Gamma_{3^{-}}^{\#1} \dagger^{\alpha\beta\chi} \Gamma_{3^{-}}^{\#1} \alpha\beta\chi = -\frac{a_0}{2}$$

|  | $\Gamma_{1^{+}}^{\#1} \alpha\beta$ | $\Gamma_{1^{+}}^{\#2} \alpha\beta$ | $\Gamma_{1^{+}}^{\#3} \alpha\beta$ | $\Gamma_{1^{-}}^{\#1} \alpha$ | $\Gamma_{1^{-}}^{\#2} \alpha$ | $\Gamma_{1^{-}}^{\#3} \alpha$ | $\Gamma_{1^{-}}^{\#4} \alpha$        | $\Gamma_{1^{-}}^{\#5} \alpha$        | $\Gamma_{1^{-}}^{\#6} \alpha$ | $h_{1^{-}}^{\#1} \alpha$ |
|--|------------------------------------|------------------------------------|------------------------------------|-------------------------------|-------------------------------|-------------------------------|--------------------------------------|--------------------------------------|-------------------------------|--------------------------|
| $\Gamma_{1^{+}}^{\#1} \dagger^{\alpha\beta}$ | $-\frac{a_0}{4}$                   | $-\frac{a_0}{2\sqrt{2}}$           | 0                                  | 0                             | 0                             | 0                             | 0                                    | 0                                    | 0                             | 0                        |
| $\Gamma_{1^{+}}^{\#2} \dagger^{\alpha\beta}$ | $-\frac{a_0}{2\sqrt{2}}$           | 0                                  | 0                                  | 0                             | 0                             | 0                             | 0                                    | 0                                    | 0                             | 0                        |
| $\Gamma_{1^{+}}^{\#3} \dagger^{\alpha\beta}$ | 0                                  | 0                                  | $\frac{a_0}{4}$                    | 0                             | 0                             | 0                             | 0                                    | 0                                    | 0                             | 0                        |
| $\Gamma_{1^{-}}^{\#1} \dagger^{\alpha}$      | 0                                  | 0                                  | 0                                  | $-\frac{a_0}{4}$              | $\frac{a_0}{2\sqrt{2}}$       | 0                             | 0                                    | 0                                    | 0                             | 0                        |
| $\Gamma_{1^{-}}^{\#2} \dagger^{\alpha}$      | 0                                  | 0                                  | 0                                  | $\frac{a_0}{2\sqrt{2}}$       | 0                             | 0                             | 0                                    | 0                                    | 0                             | 0                        |
| $\Gamma_{1^{-}}^{\#3} \dagger^{\alpha}$      | 0                                  | 0                                  | 0                                  | 0                             | 0                             | $-\frac{a_0}{3}$              | $\frac{\sqrt{5} a_0}{6}$             | $-\frac{a_0}{6\sqrt{2}}$             | $-\frac{a_0}{6}$              | 0                        |
| $\Gamma_{1^{-}}^{\#4} \dagger^{\alpha}$      | 0                                  | 0                                  | 0                                  | 0                             | 0                             | $\frac{\sqrt{5} a_0}{6}$      | $\frac{a_0}{3}$                      | $-\frac{1}{6}\sqrt{\frac{5}{2}} a_0$ | $-\frac{\sqrt{5} a_0}{6}$     | 0                        |
| $\Gamma_{1^{-}}^{\#5} \dagger^{\alpha}$      | 0                                  | 0                                  | 0                                  | 0                             | 0                             | $-\frac{a_0}{6\sqrt{2}}$      | $-\frac{1}{6}\sqrt{\frac{5}{2}} a_0$ | $\frac{a_0}{3}$                      | $\frac{a_0}{6\sqrt{2}}$       | 0                        |
| $\Gamma_{1^{-}}^{\#6} \dagger^{\alpha}$      | 0                                  | 0                                  | 0                                  | 0                             | 0                             | $-\frac{a_0}{6}$              | $-\frac{\sqrt{5} a_0}{6}$            | $\frac{a_0}{6\sqrt{2}}$              | $\frac{5 a_0}{12}$            | 0                        |
| $h_{1^{-}}^{\#1} \dagger^{\alpha}$           | 0                                  | 0                                  | 0                                  | 0                             | 0                             | 0                             | 0                                    | 0                                    | 0                             | 0                        |

|  | $\Delta_{1^{+}}^{\#1} \alpha\beta$ | $\Delta_{1^{+}}^{\#2} \alpha\beta$ | $\Delta_{1^{+}}^{\#3} \alpha\beta$ | $\Delta_{1^{-}}^{\#1} \alpha$ | $\Delta_{1^{-}}^{\#2} \alpha$ | $\Delta_{1^{-}}^{\#3} \alpha$ | $\Delta_{1^{-}}^{\#4} \alpha$ | $\Delta_{1^{-}}^{\#5} \alpha$ | $\Delta_{1^{-}}^{\#6} \alpha$ | $\mathcal{T}_{1^{-}}^{\#1} \alpha$ |
|--|------------------------------------|------------------------------------|------------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|------------------------------------|
| $\Delta_{1^{+}}^{\#1} \dagger^{\alpha\beta}$ | 0                                  | $-\frac{2\sqrt{2}}{a_0}$           | 0                                  | 0                             | 0                             | 0                             | 0                             | 0                             | 0                             | 0                                  |
| $\Delta_{1^{+}}^{\#2} \dagger^{\alpha\beta}$ | $-\frac{2\sqrt{2}}{a_0}$           | $\frac{2}{a_0}$                    | 0                                  | 0                             | 0                             | 0                             | 0                             | 0                             | 0                             | 0                                  |
| $\Delta_{1^{+}}^{\#3} \dagger^{\alpha\beta}$ | 0                                  | 0                                  | $\frac{4}{a_0}$                    | 0                             | 0                             | 0                             | 0                             | 0                             | 0                             | 0                                  |
| $\Delta_{1^{-}}^{\#1} \dagger^{\alpha}$      | 0                                  | 0                                  | 0                                  | $\frac{2\sqrt{2}}{a_0}$       | $\frac{2\sqrt{2}}{a_0}$       | 0                             | 0                             | 0                             | 0                             | 0                                  |
| $\Delta_{1^{-}}^{\#2} \dagger^{\alpha}$      | 0                                  | 0                                  | 0                                  | $\frac{2\sqrt{2}}{a_0}$       | 0                             | $-\frac{19}{12a_0}$           | $\frac{5\sqrt{5}}{12a_0}$     | $-\frac{1}{6\sqrt{2}a_0}$     | $-\frac{1}{6a_0}$             | 0                                  |
| $\Delta_{1^{-}}^{\#3} \dagger^{\alpha}$      | 0                                  | 0                                  | 0                                  | 0                             | 0                             | $\frac{5\sqrt{5}}{12a_0}$     | $\frac{1}{12a_0}$             | $-\frac{\sqrt{5}}{6a_0}$      | $-\frac{\sqrt{5}}{6a_0}$      | 0                                  |
| $\Delta_{1^{-}}^{\#4} \dagger^{\alpha}$      | 0                                  | 0                                  | 0                                  | 0                             | 0                             | $-\frac{1}{6\sqrt{2}a_0}$     | $-\frac{\sqrt{5}}{6a_0}$      | $\frac{17}{6a_0}$             | $-\frac{7}{3\sqrt{2}a_0}$     | 0                                  |
| $\Delta_{1^{-}}^{\#5} \dagger^{\alpha}$      | 0                                  | 0                                  | 0                                  | 0                             | 0                             | $-\frac{1}{6a_0}$             | $-\frac{\sqrt{5}}{6a_0}$      | $-\frac{7}{3\sqrt{2}a_0}$     | $\frac{5}{3a_0}$              | 0                                  |
| $\Delta_{1^{-}}^{\#6} \dagger^{\alpha}$      | 0                                  | 0                                  | 0                                  | 0                             | 0                             | 0                             | 0                             | 0                             | 0                             | 0                                  |
| $\mathcal{T}_{1^{-}}^{\#1} \dagger^{\alpha}$ | 0                                  | 0                                  | 0                                  | 0                             | 0                             | 0                             | 0                             | 0                             | 0                             | 0                                  |

Lagrangian density

$$-\frac{1}{2}a_0\,\Gamma^{\alpha\beta\chi}\,\Gamma_{\beta\chi\alpha}+\frac{1}{2}a_0\,\Gamma^{\alpha}\,\Gamma^{\alpha}\,\beta\,\Gamma^{\chi}\,\Gamma^{\chi}\,\beta\chi-$$

$$\frac{1}{2}a_0\,\Gamma^{\alpha\beta\chi}\,\partial_{\beta}h_{\alpha\chi}-\frac{1}{2}a_0\,\Gamma^{\alpha}\,\Gamma^{\alpha}\,\beta\,\partial_{\beta}h^{\chi}\chi+\frac{1}{4}a_0\,\Gamma^{\alpha\beta}\,\Gamma^{\alpha}\,\partial_{\beta}h^{\chi}\chi-$$

$$\frac{1}{4}a_0\,h^{\chi}\chi\,\partial_{\beta}\Gamma^{\alpha}\beta+\frac{1}{4}a_0\,h^{\chi}\chi\,\partial_{\beta}\Gamma^{\alpha\beta}-\frac{1}{2}a_0\,h_{\alpha\chi}\,\partial_{\beta}\Gamma^{\alpha\beta\chi}+$$

$$\frac{1}{2}a_0\,h^{\alpha\beta}\,\partial_{\beta}\partial_{\alpha}h^{\chi}\chi-\frac{1}{8}a_0\,\partial_{\beta}h^{\chi}\chi\,\partial^{\beta}h^{\alpha}\alpha+\frac{1}{2}a_0\,\Gamma^{\alpha}\,\Gamma^{\alpha}\,\beta\,\partial_{\chi}h^{\chi}\beta-$$

$$\frac{1}{2}a_0\,\partial_{\alpha}h^{\alpha\beta}\,\partial_{\chi}h^{\chi}\chi+\frac{1}{2}a_0\,\partial^{\beta}h^{\alpha}\alpha\,\partial_{\chi}h^{\chi}\beta-a_0\,h^{\alpha\beta}\,\partial_{\chi}\partial_{\beta}h^{\chi}\chi+$$

$$\frac{1}{4}a_0\,h^{\alpha}\alpha\,\partial_{\chi}\partial_{\beta}h^{\beta\chi}+\frac{1}{2}a_0\,h^{\alpha\beta}\,\partial_{\chi}\partial^{\chi}h_{\alpha\beta}-\frac{1}{4}a_0\,h^{\alpha}\alpha\,\partial_{\chi}\partial^{\chi}h^{\beta}\beta-$$

$$\frac{1}{4}a_0\,\partial_{\beta}h^{\alpha\chi}\partial^{\chi}h^{\alpha\beta}+\frac{3}{8}a_0\,\partial_{\chi}h_{\alpha\beta}\partial^{\chi}h^{\alpha\beta}+\frac{1}{2}a_0\,h_{\beta\chi}\,\partial^{\chi}\Gamma^{\alpha}\beta$$

Added source term:  $h^{\alpha\beta}\,\mathcal{T}_{\alpha\beta}+\Gamma^{\alpha\beta\chi}\,\Delta_{\alpha\beta\chi}$

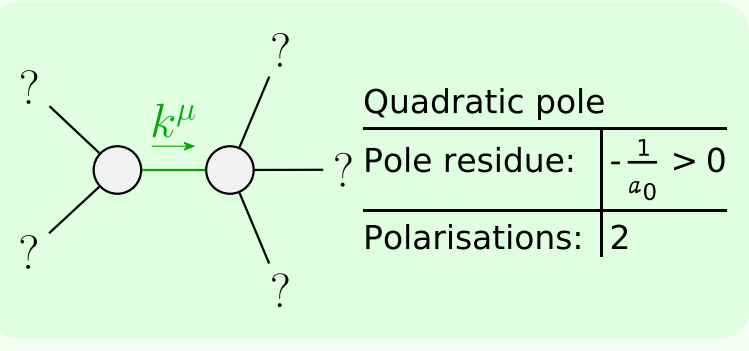
|   | $\Delta_{2^{+}}^{\#1} \alpha\beta$ | $\Delta_{2^{+}}^{\#2} \alpha\beta$ | $\Delta_{2^{+}}^{\#3} \alpha\beta$ | $\mathcal{T}_{2^{+}}^{\#1} \alpha\beta$ | $\Delta_{2^{-}}^{\#1} \alpha\beta\chi$ | $\Delta_{2^{-}}^{\#2} \alpha\beta\chi$ |
|---|------------------------------------|------------------------------------|------------------------------------|---|--|--|
| $\Delta_{2^{+}}^{\#1} \dagger^{\alpha\beta}$      | $\frac{4}{a_0}$                    | 0                                  | 0                                  | 0                                       | 0                                      | 0                                      |
| $\Delta_{2^{+}}^{\#2} \dagger^{\alpha\beta}$      | 0                                  | $-\frac{2}{a_0}$                   | 0                                  | 0                                       | 0                                      | 0                                      |
| $\Delta_{2^{+}}^{\#3} \dagger^{\alpha\beta}$      | 0                                  | 0                                  | $\frac{4}{a_0}$                    | 0                                       | 0                                      | 0                                      |
| $\mathcal{T}_{2^{+}}^{\#1} \dagger^{\alpha\beta}$ | 0                                  | 0                                  | 0                                  | $-\frac{8}{a_0k^2}$                     | 0                                      | 0                                      |
| $\Delta_{2^{-}}^{\#1} \dagger^{\alpha\beta\chi}$  | 0                                  | 0                                  | 0                                  | 0                                       | $\frac{4}{a_0}$                        | 0                                      |
| $\Delta_{2^{-}}^{\#2} \dagger^{\alpha\beta\chi}$  | 0                                  | 0                                  | 0                                  | 0                                       | 0                                      | $\frac{4}{a_0}$                        |

|                                | $\Gamma_{0^{+}}^{\#1}$ | $\Gamma_{0^{+}}^{\#2}$   | $\Gamma_{0^{+}}^{\#3}$   | $\Gamma_{0^{+}}^{\#4}$   | $h_{0^{+}}^{\#1}$  | $h_{0^{+}}^{\#2}$ | $\Gamma_{0^{-}}^{\#1}$ |
|--------------------------------|------------------------|--------------------------|--------------------------|--------------------------|--------------------|-------------------|------------------------|
| $\Gamma_{0^{+}}^{\#1} \dagger$ | $-\frac{a_0}{2}$       | 0                        | 0                        | 0                        | 0                  | 0                 | 0                      |
| $\Gamma_{0^{+}}^{\#2} \dagger$ | 0                      | 0                        | $\frac{a_0}{2}$          | $-\frac{a_0}{2\sqrt{2}}$ | 0                  | 0                 | 0                      |
| $\Gamma_{0^{+}}^{\#3} \dagger$ | 0                      | $\frac{a_0}{2}$          | 0                        | $-\frac{a_0}{2\sqrt{2}}$ | 0                  | 0                 | 0                      |
| $\Gamma_{0^{+}}^{\#4} \dagger$ | 0                      | $-\frac{a_0}{2\sqrt{2}}$ | $-\frac{a_0}{2\sqrt{2}}$ | $\frac{a_0}{2}$          | 0                  | 0                 | 0                      |
| $h_{0^{+}}^{\#1} \dagger$      | 0                      | 0                        | 0                        | 0                        | $\frac{a_0k^2}{4}$ | 0                 | 0                      |
| $h_{0^{+}}^{\#2} \dagger$      | 0                      | 0                        | 0                        | 0                        | 0                  | 0                 | 0                      |
| $\Gamma_{0^{-}}^{\#1} \dagger$ | 0                      | 0                        | 0                        | 0                        | 0                  | 0                 | $-\frac{a_0}{2}$       |

|                                     | $\Delta_{0^{+}}^{\#1}$ | $\Delta_{0^{+}}^{\#2}$    | $\Delta_{0^{+}}^{\#3}$    | $\Delta_{0^{+}}^{\#4}$    | $\mathcal{T}_{0^{+}}^{\#1}$ | $\mathcal{T}_{0^{+}}^{\#2}$ | $\Delta_{0^{-}}^{\#1}$ |
|-------------------------------------|------------------------|---------------------------|---------------------------|---------------------------|-----------------------------|-----------------------------|------------------------|
| $\Delta_{0^{+}}^{\#1} \dagger$      | $-\frac{2}{a_0}$       | 0                         | 0                         | 0                         | 0                           | 0                           | 0                      |
| $\Delta_{0^{+}}^{\#2} \dagger$      | 0                      | $-\frac{3}{4a_0}$         | $\frac{5}{4a_0}$          | $-\frac{1}{2\sqrt{2}a_0}$ | 0                           | 0                           | 0                      |
| $\Delta_{0^{+}}^{\#3} \dagger$      | 0                      | $\frac{5}{4a_0}$          | $-\frac{3}{4a_0}$         | $-\frac{1}{2\sqrt{2}a_0}$ | 0                           | 0                           | 0                      |
| $\Delta_{0^{+}}^{\#4} \dagger$      | 0                      | $-\frac{1}{2\sqrt{2}a_0}$ | $-\frac{1}{2\sqrt{2}a_0}$ | $\frac{1}{2a_0}$          | 0                           | 0                           | 0                      |
| $\mathcal{T}_{0^{+}}^{\#1} \dagger$ | 0                      | 0                         | 0                         | 0                         | $\frac{4}{a_0k^2}$          | 0                           | 0                      |
| $\mathcal{T}_{0^{+}}^{\#2} \dagger$ | 0                      | 0                         | 0                         | 0                         | 0                           | 0                           | 0                      |
| $\Delta_{0^{-}}^{\#1} \dagger$      | 0                      | 0                         | 0                         | 0                         | 0                           | 0                           | $-\frac{2}{a_0}$       |

| Source constraints   |   |
|--|---|
| SO(3) irreps   | # |
| $\mathcal{T}_{0^{+}}^{\#2} == 0$   | 1 |
| $\Delta_{0^{+}}^{\#3} + 2\Delta_{0^{+}}^{\#4} + 3\Delta_{0^{+}}^{\#2} == 0$  | 1 |
| $\mathcal{T}_{1^{-}}^{\#1\alpha} == 0$   | 3 |
| $2\Delta_{1^{-}}^{\#6\alpha} + \Delta_{1^{-}}^{\#4\alpha} + 2\Delta_{1^{-}}^{\#5\alpha} + \Delta_{1^{-}}^{\#3\alpha} == 0$ | 3 |
| Total #:   | 8 |

|  | $\Gamma_{2^{+}}^{\#1} \alpha\beta$ | $\Gamma_{2^{+}}^{\#2} \alpha\beta$ | $\Gamma_{2^{+}}^{\#3} \alpha\beta$ | $h_{2^{+}}^{\#1} \alpha\beta$ | $\Gamma_{2^{-}}^{\#1} \alpha\beta\chi$ | $\Gamma_{2^{-}}^{\#2} \alpha\beta\chi$ |
|--|------------------------------------|------------------------------------|------------------------------------|-------------------------------|--|--|
| $\Gamma_{2^{+}}^{\#1} \dagger^{\alpha\beta}$     | $\frac{a_0}{4}$                    | 0                                  | 0                                  | 0                             | 0                                      | 0                                      |
| $\Gamma_{2^{+}}^{\#2} \dagger^{\alpha\beta}$     | 0                                  | $-\frac{a_0}{2}$                   | 0                                  | 0                             | 0                                      | 0                                      |
| $\Gamma_{2^{+}}^{\#3} \dagger^{\alpha\beta}$     | 0                                  | 0                                  | $\frac{a_0}{4}$                    | 0                             | 0                                      | 0                                      |
| $h_{2^{+}}^{\#1} \dagger^{\alpha\beta}$          | 0                                  | 0                                  | 0                                  | $-\frac{a_0k^2}{8}$           | 0                                      | 0                                      |
| $\Gamma_{2^{-}}^{\#1} \dagger^{\alpha\beta\chi}$ | 0                                  | 0                                  | 0                                  | 0                             | $\frac{a_0}{4}$                        | 0                                      |
| $\Gamma_{2^{-}}^{\#2} \dagger^{\alpha\beta\chi}$ | 0                                  | 0                                  | 0                                  | 0                             | 0                                      | $\frac{a_0}{4}$                        |



$a_0 < 0$

Unitarity conditions

(No massive particles)