```
(Subsuperscript[A, Subscript[λ, f'], Subscript[J, Z]]
  (2 * Subscript[J, 0] + 1) (2 * Subscript[J, Z] + 1) ^ (1 / 2) Subsuperscript[d,
   {Subscript[λ, i], Subscript[λ, Z] - Subscript[λ, γ]}, Subscript[J, 0]]
  Subsuperscript[D, {Subscript[λ, Z], Subscript[λ, f']}, Subscript[J, Z]]
  Subsuperscript[T, {Subscript[λ, Z], Subscript[λ, γ], Subscript[λ, i]},
   Subscript[J, 0]] Exp[I * (Subscript[λ, i] - Subscript[λ, Z] + Subscript[λ, γ]) * φ]
  Exp[I * (Subscript[λ, Z] - Subscript[λ, f']) * φ'])
```

$$e^{i\varphi(\lambda_i-\lambda_Z+\lambda_\gamma)+i(\lambda_Z-\lambda_{f'})\varphi'}\,(1+2J_0)\sqrt{1+2J_Z}\,A^{J_Z}_{\lambda_{f'}}\,d^{J_0}_{\{\lambda_i,\lambda_Z-\lambda_\gamma\}}\,D^{J_Z}_{\{\lambda_Z,\lambda_{f'}\}}\,T^{J_0}_{\{\lambda_Z,\lambda_\gamma,\lambda_i\}}$$

```
Sum[Out[41], {Subscript[λ, i], -1, 1}, {Subscript[J, 0], 0, 2}]
```

$$\begin{aligned}
&e^{i\varphi(-1-\lambda_Z+\lambda_\gamma)+i(\lambda_Z-\lambda_{f'})\varphi'}\sqrt{1+2J_Z}\,A^{J_Z}_{\lambda_{f'}}\,d^{0}_{\{-1,\lambda_Z-\lambda_\gamma\}}\,D^{J_Z}_{\{\lambda_Z,\lambda_{f'}\}}\,T^{0}_{\{\lambda_Z,\lambda_\gamma,-1\}}+\\
&3\,e^{i\varphi(-1-\lambda_Z+\lambda_\gamma)+i(\lambda_Z-\lambda_{f'})\varphi'}\sqrt{1+2J_Z}\,A^{J_Z}_{\lambda_{f'}}\,d^{1}_{\{-1,\lambda_Z-\lambda_\gamma\}}\,D^{J_Z}_{\{\lambda_Z,\lambda_{f'}\}}\,T^{1}_{\{\lambda_Z,\lambda_\gamma,-1\}}+\\
&5\,e^{i\varphi(-1-\lambda_Z+\lambda_\gamma)+i(\lambda_Z-\lambda_{f'})\varphi'}\sqrt{1+2J_Z}\,A^{J_Z}_{\lambda_{f'}}\,d^{2}_{\{-1,\lambda_Z-\lambda_\gamma\}}\,D^{J_Z}_{\{\lambda_Z,\lambda_{f'}\}}\,T^{2}_{\{\lambda_Z,\lambda_\gamma,-1\}}+\\
&e^{i\varphi(-\lambda_Z+\lambda_\gamma)+i(\lambda_Z-\lambda_{f'})\varphi'}\sqrt{1+2J_Z}\,A^{J_Z}_{\lambda_{f'}}\,d^{0}_{\{0,\lambda_Z-\lambda_\gamma\}}\,D^{J_Z}_{\{\lambda_Z,\lambda_{f'}\}}\,T^{0}_{\{\lambda_Z,\lambda_\gamma,0\}}+\\
&3\,e^{i\varphi(-\lambda_Z+\lambda_\gamma)+i(\lambda_Z-\lambda_{f'})\varphi'}\sqrt{1+2J_Z}\,A^{J_Z}_{\lambda_{f'}}\,d^{1}_{\{0,\lambda_Z-\lambda_\gamma\}}\,D^{J_Z}_{\{\lambda_Z,\lambda_{f'}\}}\,T^{1}_{\{\lambda_Z,\lambda_\gamma,0\}}+\\
&5\,e^{i\varphi(-\lambda_Z+\lambda_\gamma)+i(\lambda_Z-\lambda_{f'})\varphi'}\sqrt{1+2J_Z}\,A^{J_Z}_{\lambda_{f'}}\,d^{2}_{\{0,\lambda_Z-\lambda_\gamma\}}\,D^{J_Z}_{\{\lambda_Z,\lambda_{f'}\}}\,T^{2}_{\{\lambda_Z,\lambda_\gamma,0\}}+\\
&e^{i\varphi(1-\lambda_Z+\lambda_\gamma)+i(\lambda_Z-\lambda_{f'})\varphi'}\sqrt{1+2J_Z}\,A^{J_Z}_{\lambda_{f'}}\,d^{0}_{\{1,\lambda_Z-\lambda_\gamma\}}\,D^{J_Z}_{\{\lambda_Z,\lambda_{f'}\}}\,T^{0}_{\{\lambda_Z,\lambda_\gamma,1\}}+\\
&3\,e^{i\varphi(1-\lambda_Z+\lambda_\gamma)+i(\lambda_Z-\lambda_{f'})\varphi'}\sqrt{1+2J_Z}\,A^{J_Z}_{\lambda_{f'}}\,d^{1}_{\{1,\lambda_Z-\lambda_\gamma\}}\,D^{J_Z}_{\{\lambda_Z,\lambda_{f'}\}}\,T^{1}_{\{\lambda_Z,\lambda_\gamma,1\}}+\\
&5\,e^{i\varphi(1-\lambda_Z+\lambda_\gamma)+i(\lambda_Z-\lambda_{f'})\varphi'}\sqrt{1+2J_Z}\,A^{J_Z}_{\lambda_{f'}}\,d^{2}_{\{1,\lambda_Z-\lambda_\gamma\}}\,D^{J_Z}_{\{\lambda_Z,\lambda_{f'}\}}\,T^{2}_{\{\lambda_Z,\lambda_\gamma,1\}}
\end{aligned}$$

Removing wrong wigner d matrix elements :

$$\begin{aligned}
&3\,e^{i\varphi(-1-\lambda_Z+\lambda_\gamma)+i(\lambda_Z-\lambda_{f'})\varphi'}\sqrt{1+2J_Z}\,A^{J_Z}_{\lambda_{f'}}\,d^{1}_{\{-1,\lambda_Z-\lambda_\gamma\}}\,D^{J_Z}_{\{\lambda_Z,\lambda_{f'}\}}\,T^{1}_{\{\lambda_Z,\lambda_\gamma,-1\}}+\\
&5\,e^{i\varphi(-1-\lambda_Z+\lambda_\gamma)+i(\lambda_Z-\lambda_{f'})\varphi'}\sqrt{1+2J_Z}\,A^{J_Z}_{\lambda_{f'}}\,d^{2}_{\{-1,\lambda_Z-\lambda_\gamma\}}\,D^{J_Z}_{\{\lambda_Z,\lambda_{f'}\}}\,T^{2}_{\{\lambda_Z,\lambda_\gamma,-1\}}+\\
&e^{i\varphi(-\lambda_Z+\lambda_\gamma)+i(\lambda_Z-\lambda_{f'})\varphi'}\sqrt{1+2J_Z}\,A^{J_Z}_{\lambda_{f'}}\,d^{0}_{\{0,\lambda_Z-\lambda_\gamma\}}\,D^{J_Z}_{\{\lambda_Z,\lambda_{f'}\}}\,T^{0}_{\{\lambda_Z,\lambda_\gamma,0\}}+\\
&3\,e^{i\varphi(-\lambda_Z+\lambda_\gamma)+i(\lambda_Z-\lambda_{f'})\varphi'}\sqrt{1+2J_Z}\,A^{J_Z}_{\lambda_{f'}}\,d^{1}_{\{0,\lambda_Z-\lambda_\gamma\}}\,D^{J_Z}_{\{\lambda_Z,\lambda_{f'}\}}\,T^{1}_{\{\lambda_Z,\lambda_\gamma,0\}}+\\
&5\,e^{i\varphi(-\lambda_Z+\lambda_\gamma)+i(\lambda_Z-\lambda_{f'})\varphi'}\sqrt{1+2J_Z}\,A^{J_Z}_{\lambda_{f'}}\,d^{2}_{\{0,\lambda_Z-\lambda_\gamma\}}\,D^{J_Z}_{\{\lambda_Z,\lambda_{f'}\}}\,T^{2}_{\{\lambda_Z,\lambda_\gamma,0\}}+\\
&3\,e^{i\varphi(1-\lambda_Z+\lambda_\gamma)+i(\lambda_Z-\lambda_{f'})\varphi'}\sqrt{1+2J_Z}\,A^{J_Z}_{\lambda_{f'}}\,d^{1}_{\{1,\lambda_Z-\lambda_\gamma\}}\,D^{J_Z}_{\{\lambda_Z,\lambda_{f'}\}}\,T^{1}_{\{\lambda_Z,\lambda_\gamma,1\}}+\\
&5\,e^{i\varphi(1-\lambda_Z+\lambda_\gamma)+i(\lambda_Z-\lambda_{f'})\varphi'}\sqrt{1+2J_Z}\,A^{J_Z}_{\lambda_{f'}}\,d^{2}_{\{1,\lambda_Z-\lambda_\gamma\}}\,D^{J_Z}_{\{\lambda_Z,\lambda_{f'}\}}\,T^{2}_{\{\lambda_Z,\lambda_\gamma,1\}}
\end{aligned}$$

```
Collect[
 Collect[Collect[Out[43], Subsuperscript[A, Subscript[λ, f'], Subscript[J, Z]]],
   (1 + 2 Subscript[J, Z]) ^ (1 / 2)],
 Subsuperscript[D, {Subscript[λ, Z], Subscript[λ, f']}, Subscript[J, Z]]]
```

$$\begin{aligned}
&\sqrt{1+2J_Z}\,A^{J_Z}_{\lambda_{f'}}\,D^{J_Z}_{\{\lambda_Z,\lambda_{f'}\}}\\
&\quad(3\,e^{i\varphi(-1-\lambda_Z+\lambda_\gamma)+i(\lambda_Z-\lambda_{f'})\varphi'}\,d^{1}_{\{-1,\lambda_Z-\lambda_\gamma\}}\,T^{1}_{\{\lambda_Z,\lambda_\gamma,-1\}}+5\,e^{i\varphi(-1-\lambda_Z+\lambda_\gamma)+i(\lambda_Z-\lambda_{f'})\varphi'}\,d^{2}_{\{-1,\lambda_Z-\lambda_\gamma\}}\,T^{2}_{\{\lambda_Z,\lambda_\gamma,-1\}}+\\
&\qquad e^{i\varphi(-\lambda_Z+\lambda_\gamma)+i(\lambda_Z-\lambda_{f'})\varphi'}\,d^{0}_{\{0,\lambda_Z-\lambda_\gamma\}}\,T^{0}_{\{\lambda_Z,\lambda_\gamma,0\}}+3\,e^{i\varphi(-\lambda_Z+\lambda_\gamma)+i(\lambda_Z-\lambda_{f'})\varphi'}\,d^{1}_{\{0,\lambda_Z-\lambda_\gamma\}}\,T^{1}_{\{\lambda_Z,\lambda_\gamma,0\}}+\\
&\qquad 5\,e^{i\varphi(-\lambda_Z+\lambda_\gamma)+i(\lambda_Z-\lambda_{f'})\varphi'}\,d^{2}_{\{0,\lambda_Z-\lambda_\gamma\}}\,T^{2}_{\{\lambda_Z,\lambda_\gamma,0\}}+3\,e^{i\varphi(1-\lambda_Z+\lambda_\gamma)+i(\lambda_Z-\lambda_{f'})\varphi'}\,d^{1}_{\{1,\lambda_Z-\lambda_\gamma\}}\,T^{1}_{\{\lambda_Z,\lambda_\gamma,1\}}+\\
&\qquad 5\,e^{i\varphi(1-\lambda_Z+\lambda_\gamma)+i(\lambda_Z-\lambda_{f'})\varphi'}\,d^{2}_{\{1,\lambda_Z-\lambda_\gamma\}}\,T^{2}_{\{\lambda_Z,\lambda_\gamma,1\}})
\end{aligned}$$

```
Sum[Out[58], {Subscript[λ, Z], -1, 1}]
```

$$\sqrt{1+2\,J_Z}\;A^{J_Z}_{\lambda_{f'}}\;D^{J_Z}_{\{-1,\lambda_{f'}\}}$$
$$\Big(3\,e^{i\varphi\lambda_\gamma+i(-1-\lambda_{f'})\varphi'}\,d^1_{\{-1,-1-\lambda_\gamma\}}\,T^1_{\{-1,\lambda_\gamma,-1\}}+5\,e^{i\varphi\lambda_\gamma+i(-1-\lambda_{f'})\varphi'}\,d^2_{\{-1,-1-\lambda_\gamma\}}\,T^2_{\{-1,\lambda_\gamma,-1\}}+$$
$$e^{i\varphi(1+\lambda_\gamma)+i(-1-\lambda_{f'})\varphi'}\,d^0_{\{0,-1-\lambda_\gamma\}}\,T^0_{\{-1,\lambda_\gamma,0\}}+3\,e^{i\varphi(1+\lambda_\gamma)+i(-1-\lambda_{f'})\varphi'}\,d^1_{\{0,-1-\lambda_\gamma\}}\,T^1_{\{-1,\lambda_\gamma,0\}}+$$
$$5\,e^{i\varphi(1+\lambda_\gamma)+i(-1-\lambda_{f'})\varphi'}\,d^2_{\{0,-1-\lambda_\gamma\}}\,T^2_{\{-1,\lambda_\gamma,0\}}+3\,e^{i\varphi(2+\lambda_\gamma)+i(-1-\lambda_{f'})\varphi'}\,d^1_{\{1,-1-\lambda_\gamma\}}\,T^1_{\{-1,\lambda_\gamma,1\}}+$$
$$5\,e^{i\varphi(2+\lambda_\gamma)+i(-1-\lambda_{f'})\varphi'}\,d^2_{\{1,-1-\lambda_\gamma\}}\,T^2_{\{-1,\lambda_\gamma,1\}}\Big)+$$
$$\sqrt{1+2\,J_Z}\;A^{J_Z}_{\lambda_{f'}}\;D^{J_Z}_{\{0,\lambda_{f'}\}}\;\Big(3\,e^{i\varphi(-1+\lambda_\gamma)-i\lambda_{f'}\varphi'}\,d^1_{\{-1,-\lambda_\gamma\}}\,T^1_{\{0,\lambda_\gamma,-1\}}+5\,e^{i\varphi(-1+\lambda_\gamma)-i\lambda_{f'}\varphi'}\,d^2_{\{-1,-\lambda_\gamma\}}\,T^2_{\{0,\lambda_\gamma,-1\}}+$$
$$e^{i\varphi\lambda_\gamma-i\lambda_{f'}\varphi'}\,d^0_{\{0,-\lambda_\gamma\}}\,T^0_{\{0,\lambda_\gamma,0\}}+3\,e^{i\varphi\lambda_\gamma-i\lambda_{f'}\varphi'}\,d^1_{\{0,-\lambda_\gamma\}}\,T^1_{\{0,\lambda_\gamma,0\}}+5\,e^{i\varphi\lambda_\gamma-i\lambda_{f'}\varphi'}\,d^2_{\{0,-\lambda_\gamma\}}\,T^2_{\{0,\lambda_\gamma,0\}}+$$
$$3\,e^{i\varphi(1+\lambda_\gamma)-i\lambda_{f'}\varphi'}\,d^1_{\{1,-\lambda_\gamma\}}\,T^1_{\{0,\lambda_\gamma,1\}}+5\,e^{i\varphi(1+\lambda_\gamma)-i\lambda_{f'}\varphi'}\,d^2_{\{1,-\lambda_\gamma\}}\,T^2_{\{0,\lambda_\gamma,1\}}\Big)+$$
$$\sqrt{1+2\,J_Z}\;A^{J_Z}_{\lambda_{f'}}\;D^{J_Z}_{\{1,\lambda_{f'}\}}\;\Big(3\,e^{i\varphi(-2+\lambda_\gamma)+i(1-\lambda_{f'})\varphi'}\,d^1_{\{-1,1-\lambda_\gamma\}}\,T^1_{\{1,\lambda_\gamma,-1\}}+$$
$$5\,e^{i\varphi(-2+\lambda_\gamma)+i(1-\lambda_{f'})\varphi'}\,d^2_{\{-1,1-\lambda_\gamma\}}\,T^2_{\{1,\lambda_\gamma,-1\}}+e^{i\varphi(-1+\lambda_\gamma)+i(1-\lambda_{f'})\varphi'}\,d^0_{\{0,1-\lambda_\gamma\}}\,T^0_{\{1,\lambda_\gamma,0\}}+$$
$$3\,e^{i\varphi(-1+\lambda_\gamma)+i(1-\lambda_{f'})\varphi'}\,d^1_{\{0,1-\lambda_\gamma\}}\,T^1_{\{1,\lambda_\gamma,0\}}+5\,e^{i\varphi(-1+\lambda_\gamma)+i(1-\lambda_{f'})\varphi'}\,d^2_{\{0,1-\lambda_\gamma\}}\,T^2_{\{1,\lambda_\gamma,0\}}+$$
$$3\,e^{i\varphi\lambda_\gamma+i(1-\lambda_{f'})\varphi'}\,d^1_{\{1,1-\lambda_\gamma\}}\,T^1_{\{1,\lambda_\gamma,1\}}+5\,e^{i\varphi\lambda_\gamma+i(1-\lambda_{f'})\varphi'}\,d^2_{\{1,1-\lambda_\gamma\}}\,T^2_{\{1,\lambda_\gamma,1\}}\Big)$$

Putting λ_γ = 1 or −1 where J = 1 and λ_Z = 1 or −1 (also incorporating number coeficients into Ts and As)

```
(
 A^{Jz}_{λf'} D^{Jz}_{{-1,λf'}}
   (
    Sum[(e^{i φ λγ+i (-1-λf') φ'} d^1_{{-1,-1-λγ}} T^1_{{-1,λγ,-1}}), {Subscript[λ, γ], -1, -1}] +
     e^{i φ λγ+i (-1-λf') φ'} d^2_{{-1,-1-λγ}} T^2_{{-1,λγ,-1}} +
     Sum[e^{i φ (1+λγ)+i (-1-λf') φ'} d^0_{{0,-1-λγ}} T^0_{{-1,λγ,0}}, {Subscript[λ, γ], -1, -1}] +
     Sum[e^{i φ (1+λγ)+i (-1-λf') φ'} d^1_{{0,-1-λγ}} T^1_{{-1,λγ,0}}, {Subscript[λ, γ], -1, -1}] +
     e^{i φ (1+λγ)+i (-1-λf') φ'} d^2_{{0,-1-λγ}} T^2_{{-1,λγ,0}} +
     Sum[e^{i φ (2+λγ)+i (-1-λf') φ'} d^1_{{1,-1-λγ}} T^1_{{-1,λγ,1}}, {Subscript[λ, γ], -1, -1}] +
     e^{i φ (2+λγ)+i (-1-λf') φ'} d^2_{{1,-1-λγ}} T^2_{{-1,λγ,1}}
   ) +
  A^{Jz}_{λf'} D^{Jz}_{{0,λf'}}
   (
    e^{i φ (-1+λγ)-i λf' φ'} d^1_{{-1,-λγ}} T^1_{{0,λγ,-1}} +
     e^{i φ (-1+λγ)-i λf' φ'} d^2_{{-1,-λγ}} T^2_{{0,λγ,-1}} +
     e^{i φ λγ-i λf' φ'} d^0_{{0,-λγ}} T^0_{{0,λγ,0}} +
     e^{i φ λγ-i λf' φ'} d^1_{{0,-λγ}} T^1_{{0,λγ,0}} +
     e^{i φ λγ-i λf' φ'} d^2_{{0,-λγ}} T^2_{{0,λγ,0}} +
     e^{i φ (1+λγ)-i λf' φ'} d^1_{{1,-λγ}} T^1_{{0,λγ,1}} +
     e^{i φ (1+λγ)-i λf' φ'} d^2_{{1,-λγ}} T^2_{{0,λγ,1}}
   ) +
  A^{Jz}_{λf'} D^{Jz}_{{1,λf'}}
   (
    Sum[e^{i φ (-2+λγ)+i (1-λf') φ'} d^1_{{-1,1-λγ}} T^1_{{1,λγ,-1}}, {Subscript[λ, γ], 1, 1}] +
     e^{i φ (-2+λγ)+i (1-λf') φ'} d^2_{{-1,1-λγ}} T^2_{{1,λγ,-1}} +
     Sum[e^{i φ (-1+λγ)+i (1-λf') φ'} d^0_{{0,1-λγ}} T^0_{{1,λγ,0}}, {Subscript[λ, γ], 1, 1}] +
     Sum[e^{i φ (-1+λγ)+i (1-λf') φ'} d^1_{{0,1-λγ}} T^1_{{1,λγ,0}}, {Subscript[λ, γ], 1, 1}] +
     e^{i φ (-1+λγ)+i (1-λf') φ'} d^2_{{0,1-λγ}} T^2_{{1,λγ,0}} +
     Sum[e^{i φ λγ+i (1-λf') φ'} d^1_{{1,1-λγ}} T^1_{{1,λγ,1}}, {Subscript[λ, γ], 1, 1}] +
     e^{i φ λγ+i (1-λf') φ'} d^2_{{1,1-λγ}} T^2_{{1,λγ,1}}
   )
)
```

$$
\begin{aligned}
&A^{J_z}_{\lambda_{f'}}\, D^{J_z}_{\{-1,\lambda_{f'}\}} \\
&\quad \Big(e^{-i\varphi+i(-1-\lambda_{f'})\varphi'} d^1_{\{-1,0\}} T^1_{\{-1,-1,-1\}} + e^{i(-1-\lambda_{f'})\varphi'} d^0_{\{0,0\}} T^0_{\{-1,-1,0\}} + e^{i(-1-\lambda_{f'})\varphi'} d^1_{\{0,0\}} T^1_{\{-1,-1,0\}} + \\
&\qquad e^{i\varphi+i(-1-\lambda_{f'})\varphi'} d^1_{\{1,0\}} T^1_{\{-1,-1,1\}} + e^{i\varphi\lambda_\gamma+i(-1-\lambda_{f'})\varphi'} d^2_{\{-1,-1-\lambda_\gamma\}} T^2_{\{-1,\lambda_\gamma,-1\}} + \\
&\qquad e^{i\varphi(1+\lambda_\gamma)+i(-1-\lambda_{f'})\varphi'} d^2_{\{0,-1-\lambda_\gamma\}} T^2_{\{-1,\lambda_\gamma,0\}} + e^{i\varphi(2+\lambda_\gamma)+i(-1-\lambda_{f'})\varphi'} d^2_{\{1,-1-\lambda_\gamma\}} T^2_{\{-1,\lambda_\gamma,1\}}\Big) + \\
&A^{J_z}_{\lambda_{f'}}\, D^{J_z}_{\{0,\lambda_{f'}\}} \Big(e^{i\varphi(-1+\lambda_\gamma)-i\lambda_{f'}\varphi'} d^1_{\{-1,-\lambda_\gamma\}} T^1_{\{0,\lambda_\gamma,-1\}} + e^{i\varphi(-1+\lambda_\gamma)-i\lambda_{f'}\varphi'} d^2_{\{-1,-\lambda_\gamma\}} T^2_{\{0,\lambda_\gamma,-1\}} + \\
&\qquad e^{i\varphi\lambda_\gamma-i\lambda_{f'}\varphi'} d^0_{\{0,-\lambda_\gamma\}} T^0_{\{0,\lambda_\gamma,0\}} + e^{i\varphi\lambda_\gamma-i\lambda_{f'}\varphi'} d^1_{\{0,-\lambda_\gamma\}} T^1_{\{0,\lambda_\gamma,0\}} + e^{i\varphi\lambda_\gamma-i\lambda_{f'}\varphi'} d^2_{\{0,-\lambda_\gamma\}} T^2_{\{0,\lambda_\gamma,0\}} + \\
&\qquad e^{i\varphi(1+\lambda_\gamma)-i\lambda_{f'}\varphi'} d^1_{\{1,-\lambda_\gamma\}} T^1_{\{0,\lambda_\gamma,1\}} + e^{i\varphi(1+\lambda_\gamma)-i\lambda_{f'}\varphi'} d^2_{\{1,-\lambda_\gamma\}} T^2_{\{0,\lambda_\gamma,1\}}\Big) + \\
&A^{J_z}_{\lambda_{f'}}\, D^{J_z}_{\{1,\lambda_{f'}\}} \Big(e^{-i\varphi+i(1-\lambda_{f'})\varphi'} d^1_{\{-1,0\}} T^1_{\{1,1,-1\}} + e^{i(1-\lambda_{f'})\varphi'} d^0_{\{0,0\}} T^0_{\{1,1,0\}} + e^{i(1-\lambda_{f'})\varphi'} d^1_{\{0,0\}} T^1_{\{1,1,0\}} + \\
&\qquad e^{i\varphi+i(1-\lambda_{f'})\varphi'} d^1_{\{1,0\}} T^1_{\{1,1,1\}} + e^{i\varphi(-2+\lambda_\gamma)+i(1-\lambda_{f'})\varphi'} d^2_{\{-1,1-\lambda_\gamma\}} T^2_{\{1,\lambda_\gamma,-1\}} + \\
&\qquad e^{i\varphi(-1+\lambda_\gamma)+i(1-\lambda_{f'})\varphi'} d^2_{\{0,1-\lambda_\gamma\}} T^2_{\{1,\lambda_\gamma,0\}} + e^{i\varphi\lambda_\gamma+i(1-\lambda_{f'})\varphi'} d^2_{\{1,1-\lambda_\gamma\}} T^2_{\{1,\lambda_\gamma,1\}}\Big)
\end{aligned}
$$

Just writing it out in a nice form and summing over J_z

```
(
 Sum[A^{J_Z}_{λf'} D^{J_Z}_{{-1,λf'}} , {Subscript[J, Z], 0, 2}]
   (
    e^{-i φ+i (-1-λf') φ'} d^1_{{-1,0}} T^1_{{-1,-1,-1}} +
     e^{i (-1-λf') φ'} d^0_{{0,0}} T^0_{{-1,-1,0}} +
     e^{i (-1-λf') φ'} d^1_{{0,0}} T^1_{{-1,-1,0}} +
     e^{i φ+i (-1-λf') φ'} d^1_{{1,0}} T^1_{{-1,-1,1}} +
     e^{i φ λγ+i (-1-λf') φ'} d^2_{{-1,-1-λγ}} T^2_{{-1,λγ,-1}} +
     e^{i φ (1+λγ)+i (-1-λf') φ'} d^2_{{0,-1-λγ}} T^2_{{-1,λγ,0}} +
     e^{i φ (2+λγ)+i (-1-λf') φ'} d^2_{{1,-1-λγ}} T^2_{{-1,λγ,1}}
   ) +
  Sum[A^{J_Z}_{λf'} D^{J_Z}_{{0,λf'}} , {Subscript[J, Z], 0, 2}]
   (
    e^{i φ (-1+λγ)-i λf' φ'} d^1_{{-1,-λγ}} T^1_{{0,λγ,-1}} +
     e^{i φ (-1+λγ)-i λf' φ'} d^2_{{-1,-λγ}} T^2_{{0,λγ,-1}} +
     e^{i φ λγ-i λf' φ'} d^0_{{0,-λγ}} T^0_{{0,λγ,0}} +
     e^{i φ λγ-i λf' φ'} d^1_{{0,-λγ}} T^1_{{0,λγ,0}} +
     e^{i φ λγ-i λf' φ'} d^2_{{0,-λγ}} T^2_{{0,λγ,0}} +
     e^{i φ (1+λγ)-i λf' φ'} d^1_{{1,-λγ}} T^1_{{0,λγ,1}} +
     e^{i φ (1+λγ)-i λf' φ'} d^2_{{1,-λγ}} T^2_{{0,λγ,1}}
   ) +
  Sum[A^{J_Z}_{λf'} D^{J_Z}_{{1,λf'}} , {Subscript[J, Z], 0, 2}]
   (e^{-i φ+i (1-λf') φ'} d^1_{{-1,0}} T^1_{{1,1,-1}} +
     e^{i (1-λf') φ'} d^0_{{0,0}} T^0_{{1,1,0}} +
     e^{i (1-λf') φ'} d^1_{{0,0}} T^1_{{1,1,0}} +
     e^{i φ+i (1-λf') φ'} d^1_{{1,0}} T^1_{{1,1,1}} +
     e^{i φ (-2+λγ)+i (1-λf') φ'} d^2_{{-1,1-λγ}} T^2_{{1,λγ,-1}} +
     e^{i φ (-1+λγ)+i (1-λf') φ'} d^2_{{0,1-λγ}} T^2_{{1,λγ,0}} +
     e^{i φ λγ+i (1-λf') φ'} d^2_{{1,1-λγ}} T^2_{{1,λγ,1}}
   )
)
```

$$
\begin{aligned}
&\left(A^0_{\lambda f'} D^0_{\{-1,\lambda f'\}} + A^1_{\lambda f'} D^1_{\{-1,\lambda f'\}} + A^2_{\lambda f'} D^2_{\{-1,\lambda f'\}}\right)\\
&\quad\Big(e^{-i\varphi+i(-1-\lambda f')\varphi'} d^1_{\{-1,0\}} T^1_{\{-1,-1,-1\}} + e^{i(-1-\lambda f')\varphi'} d^0_{\{0,0\}} T^0_{\{-1,-1,0\}} + e^{i(-1-\lambda f')\varphi'} d^1_{\{0,0\}} T^1_{\{-1,-1,0\}} +\\
&\qquad e^{i\varphi+i(-1-\lambda f')\varphi'} d^1_{\{1,0\}} T^1_{\{-1,-1,1\}} + e^{i\varphi\lambda_\gamma+i(-1-\lambda f')\varphi'} d^2_{\{-1,-1-\lambda_\gamma\}} T^2_{\{-1,\lambda_\gamma,-1\}} +\\
&\qquad e^{i\varphi(1+\lambda_\gamma)+i(-1-\lambda f')\varphi'} d^2_{\{0,-1-\lambda_\gamma\}} T^2_{\{-1,\lambda_\gamma,0\}} + e^{i\varphi(2+\lambda_\gamma)+i(-1-\lambda f')\varphi'} d^2_{\{1,-1-\lambda_\gamma\}} T^2_{\{-1,\lambda_\gamma,1\}}\Big) +\\
&\left(A^0_{\lambda f'} D^0_{\{0,\lambda f'\}} + A^1_{\lambda f'} D^1_{\{0,\lambda f'\}} + A^2_{\lambda f'} D^2_{\{0,\lambda f'\}}\right)\\
&\quad\Big(e^{i\varphi(-1+\lambda_\gamma)-i\lambda f'\varphi'} d^1_{\{-1,-\lambda_\gamma\}} T^1_{\{0,\lambda_\gamma,-1\}} + e^{i\varphi(-1+\lambda_\gamma)-i\lambda f'\varphi'} d^2_{\{-1,-\lambda_\gamma\}} T^2_{\{0,\lambda_\gamma,-1\}} +\\
&\qquad e^{i\varphi\lambda_\gamma-i\lambda f'\varphi'} d^0_{\{0,-\lambda_\gamma\}} T^0_{\{0,\lambda_\gamma,0\}} + e^{i\varphi\lambda_\gamma-i\lambda f'\varphi'} d^1_{\{0,-\lambda_\gamma\}} T^1_{\{0,\lambda_\gamma,0\}} + e^{i\varphi\lambda_\gamma-i\lambda f'\varphi'} d^2_{\{0,-\lambda_\gamma\}} T^2_{\{0,\lambda_\gamma,0\}} +\\
&\qquad e^{i\varphi(1+\lambda_\gamma)-i\lambda f'\varphi'} d^1_{\{1,-\lambda_\gamma\}} T^1_{\{0,\lambda_\gamma,1\}} + e^{i\varphi(1+\lambda_\gamma)-i\lambda f'\varphi'} d^2_{\{1,-\lambda_\gamma\}} T^2_{\{0,\lambda_\gamma,1\}}\Big) +\\
&\left(A^0_{\lambda f'} D^0_{\{1,\lambda f'\}} + A^1_{\lambda f'} D^1_{\{1,\lambda f'\}} + A^2_{\lambda f'} D^2_{\{1,\lambda f'\}}\right)\Big(e^{-i\varphi+i(1-\lambda f')\varphi'} d^1_{\{-1,0\}} T^1_{\{1,1,-1\}} + e^{i(1-\lambda f')\varphi'} d^0_{\{0,0\}} T^0_{\{1,1,0\}} +\\
&\qquad e^{i(1-\lambda f')\varphi'} d^1_{\{0,0\}} T^1_{\{1,1,0\}} + e^{i\varphi+i(1-\lambda f')\varphi'} d^1_{\{1,0\}} T^1_{\{1,1,1\}} + e^{i\varphi(-2+\lambda_\gamma)+i(1-\lambda f')\varphi'} d^2_{\{-1,1-\lambda_\gamma\}} T^2_{\{1,\lambda_\gamma,-1\}} +\\
&\qquad e^{i\varphi(-1+\lambda_\gamma)+i(1-\lambda f')\varphi'} d^2_{\{0,1-\lambda_\gamma\}} T^2_{\{1,\lambda_\gamma,0\}} + e^{i\varphi\lambda_\gamma+i(1-\lambda f')\varphi'} d^2_{\{1,1-\lambda_\gamma\}} T^2_{\{1,\lambda_\gamma,1\}}\Big)
\end{aligned}
$$

Removing wrong Wigner d matrix elements and putting in $\lambda_{f'} = 0$ where $J_Z = 0$:

```
param =
 {
  Subsuperscript[d, {0, 0}, 0] → 1,
  Subsuperscript[D, {0, 0}, 0] → 1
 }
```

$$\left(A^1_{\lambda_{f'}} D^1_{\{-1,\lambda_{f'}\}} + A^2_{\lambda_{f'}} D^2_{\{-1,\lambda_{f'}\}}\right)$$
$$\left(e^{-i\varphi+i(-1-\lambda_{f'})\varphi'} d^1_{\{-1,0\}} T^1_{\{-1,-1,-1\}} + e^{i(-1-\lambda_{f'})\varphi'} d^0_{\{0,0\}} T^0_{\{-1,-1,0\}} + e^{i(-1-\lambda_{f'})\varphi'} d^1_{\{0,0\}} T^1_{\{-1,-1,0\}} + e^{i\varphi+i(-1-\lambda_{f'})\varphi'} d^1_{\{1,0\}} T^1_{\{-1,-1,1\}} + e^{i\varphi\lambda_\gamma+i(-1-\lambda_{f'})\varphi'} d^2_{\{-1,-1-\lambda_\gamma\}} T^2_{\{-1,\lambda_\gamma,-1\}} + e^{i\varphi(1+\lambda_\gamma)+i(-1-\lambda_{f'})\varphi'} d^2_{\{0,-1-\lambda_\gamma\}} T^2_{\{-1,\lambda_\gamma,0\}} + e^{i\varphi(2+\lambda_\gamma)+i(-1-\lambda_{f'})\varphi'} d^2_{\{1,-1-\lambda_\gamma\}} T^2_{\{-1,\lambda_\gamma,1\}}\right) +$$
$$\left(\mathrm{Sum}[A^0_{\lambda_{f'}} D^0_{\{0,\lambda_{f'}\}}, \{\mathrm{Subscript}[\lambda, f'], 0, 0\}] + A^1_{\lambda_{f'}} D^1_{\{0,\lambda_{f'}\}} + A^2_{\lambda_{f'}} D^2_{\{0,\lambda_{f'}\}}\right)$$
$$\left(e^{i\varphi(-1+\lambda_\gamma)-i\lambda_{f'}\varphi'} d^1_{\{-1,-\lambda_\gamma\}} T^1_{\{0,\lambda_\gamma,-1\}} + e^{i\varphi(-1+\lambda_\gamma)-i\lambda_{f'}\varphi'} d^2_{\{-1,-\lambda_\gamma\}} T^2_{\{0,\lambda_\gamma,-1\}} + e^{i\varphi\lambda_\gamma-i\lambda_{f'}\varphi'} d^0_{\{0,-\lambda_\gamma\}} T^0_{\{0,\lambda_\gamma,0\}} + e^{i\varphi\lambda_\gamma-i\lambda_{f'}\varphi'} d^1_{\{0,-\lambda_\gamma\}} T^1_{\{0,\lambda_\gamma,0\}} + e^{i\varphi\lambda_\gamma-i\lambda_{f'}\varphi'} d^2_{\{0,-\lambda_\gamma\}} T^2_{\{0,\lambda_\gamma,0\}} + e^{i\varphi(1+\lambda_\gamma)-i\lambda_{f'}\varphi'} d^1_{\{1,-\lambda_\gamma\}} T^1_{\{0,\lambda_\gamma,1\}} + e^{i\varphi(1+\lambda_\gamma)-i\lambda_{f'}\varphi'} d^2_{\{1,-\lambda_\gamma\}} T^2_{\{0,\lambda_\gamma,1\}}\right) +$$
$$\left(A^1_{\lambda_{f'}} D^1_{\{1,\lambda_{f'}\}} + A^2_{\lambda_{f'}} D^2_{\{1,\lambda_{f'}\}}\right) \left(e^{-i\varphi+i(1-\lambda_{f'})\varphi'} d^1_{\{-1,0\}} T^1_{\{1,1,-1\}} + e^{i(1-\lambda_{f'})\varphi'} d^0_{\{0,0\}} T^0_{\{1,1,0\}} + e^{i(1-\lambda_{f'})\varphi'} d^1_{\{0,0\}} T^1_{\{1,1,0\}} + e^{i\varphi+i(1-\lambda_{f'})\varphi'} d^1_{\{1,0\}} T^1_{\{1,1,1\}} + e^{i\varphi(-2+\lambda_\gamma)+i(1-\lambda_{f'})\varphi'} d^2_{\{-1,1-\lambda_\gamma\}} T^2_{\{1,\lambda_\gamma,-1\}} + e^{i\varphi(-1+\lambda_\gamma)+i(1-\lambda_{f'})\varphi'} d^2_{\{0,1-\lambda_\gamma\}} T^2_{\{1,\lambda_\gamma,0\}} + e^{i\varphi\lambda_\gamma+i(1-\lambda_{f'})\varphi'} d^2_{\{1,1-\lambda_\gamma\}} T^2_{\{1,\lambda_\gamma,1\}}\right)$$

Out[66] /. param

$$\left(A^1_{\lambda_{f'}} D^1_{\{-1,\lambda_{f'}\}} + A^2_{\lambda_{f'}} D^2_{\{-1,\lambda_{f'}\}}\right)$$
$$\left(e^{-i\varphi+i(-1-\lambda_{f'})\varphi'} d^1_{\{-1,0\}} T^1_{\{-1,-1,-1\}} + e^{i(-1-\lambda_{f'})\varphi'} T^0_{\{-1,-1,0\}} + e^{i(-1-\lambda_{f'})\varphi'} d^1_{\{0,0\}} T^1_{\{-1,-1,0\}} + e^{i\varphi+i(-1-\lambda_{f'})\varphi'} d^1_{\{1,0\}} T^1_{\{-1,-1,1\}} + e^{i\varphi\lambda_\gamma+i(-1-\lambda_{f'})\varphi'} d^2_{\{-1,-1-\lambda_\gamma\}} T^2_{\{-1,\lambda_\gamma,-1\}} + e^{i\varphi(1+\lambda_\gamma)+i(-1-\lambda_{f'})\varphi'} d^2_{\{0,-1-\lambda_\gamma\}} T^2_{\{-1,\lambda_\gamma,0\}} + e^{i\varphi(2+\lambda_\gamma)+i(-1-\lambda_{f'})\varphi'} d^2_{\{1,-1-\lambda_\gamma\}} T^2_{\{-1,\lambda_\gamma,1\}}\right) +$$
$$\left(A^0_0 + A^1_{\lambda_{f'}} D^1_{\{0,\lambda_{f'}\}} + A^2_{\lambda_{f'}} D^2_{\{0,\lambda_{f'}\}}\right) \left(e^{i\varphi(-1+\lambda_\gamma)-i\lambda_{f'}\varphi'} d^1_{\{-1,-\lambda_\gamma\}} T^1_{\{0,\lambda_\gamma,-1\}} + e^{i\varphi(-1+\lambda_\gamma)-i\lambda_{f'}\varphi'} d^2_{\{-1,-\lambda_\gamma\}} T^2_{\{0,\lambda_\gamma,-1\}} + e^{i\varphi\lambda_\gamma-i\lambda_{f'}\varphi'} d^0_{\{0,-\lambda_\gamma\}} T^0_{\{0,\lambda_\gamma,0\}} + e^{i\varphi\lambda_\gamma-i\lambda_{f'}\varphi'} d^1_{\{0,-\lambda_\gamma\}} T^1_{\{0,\lambda_\gamma,0\}} + e^{i\varphi\lambda_\gamma-i\lambda_{f'}\varphi'} d^2_{\{0,-\lambda_\gamma\}} T^2_{\{0,\lambda_\gamma,0\}} + e^{i\varphi(1+\lambda_\gamma)-i\lambda_{f'}\varphi'} d^1_{\{1,-\lambda_\gamma\}} T^1_{\{0,\lambda_\gamma,1\}} + e^{i\varphi(1+\lambda_\gamma)-i\lambda_{f'}\varphi'} d^2_{\{1,-\lambda_\gamma\}} T^2_{\{0,\lambda_\gamma,1\}}\right) +$$
$$\left(A^1_{\lambda_{f'}} D^1_{\{1,\lambda_{f'}\}} + A^2_{\lambda_{f'}} D^2_{\{1,\lambda_{f'}\}}\right) \left(e^{-i\varphi+i(1-\lambda_{f'})\varphi'} d^1_{\{-1,0\}} T^1_{\{1,1,-1\}} + e^{i(1-\lambda_{f'})\varphi'} T^0_{\{1,1,0\}} + e^{i(1-\lambda_{f'})\varphi'} d^1_{\{0,0\}} T^1_{\{1,1,0\}} + e^{i\varphi+i(1-\lambda_{f'})\varphi'} d^1_{\{1,0\}} T^1_{\{1,1,1\}} + e^{i\varphi(-2+\lambda_\gamma)+i(1-\lambda_{f'})\varphi'} d^2_{\{-1,1-\lambda_\gamma\}} T^2_{\{1,\lambda_\gamma,-1\}} + e^{i\varphi(-1+\lambda_\gamma)+i(1-\lambda_{f'})\varphi'} d^2_{\{0,1-\lambda_\gamma\}} T^2_{\{1,\lambda_\gamma,0\}} + e^{i\varphi\lambda_\gamma+i(1-\lambda_{f'})\varphi'} d^2_{\{1,1-\lambda_\gamma\}} T^2_{\{1,\lambda_\gamma,1\}}\right)$$

$$
\begin{aligned}
&\frac{1}{32}\Big(4\,\mathrm{Cos}\Big[\frac{\theta'}{2}\Big]^4 {A^1_{-1}}^2 + 8\,\mathrm{Cos}\Big[\frac{\theta'}{2}\Big]^4 (-1+2\,\mathrm{Cos}[\theta'])\,A^1_{-1}\,A^2_{-1} + \\
&\quad 4\,\mathrm{Cos}\Big[\frac{\theta'}{2}\Big]^4 (1-2\,\mathrm{Cos}[\theta'])^2\,{A^2_{-1}}^2 + \mathrm{Sin}[\theta']^2\,{A^1_0}^2 + 2\sqrt{6}\,\mathrm{Cos}[\theta']\,\mathrm{Sin}[\theta']^2\,A^1_0\,A^2_0 + \\
&\quad 6\,\mathrm{Cos}[\theta']^2\,\mathrm{Sin}[\theta']^2\,{A^2_0}^2 + {A^1_1}^2 - 2\,\mathrm{Cos}[\theta']\,{A^1_1}^2 + \mathrm{Cos}[\theta']^2\,{A^1_1}^2 + 2\,A^1_1\,A^2_1 - 6\,\mathrm{Cos}[\theta']^2\,A^1_1\,A^2_1 + \\
&\quad 4\,\mathrm{Cos}[\theta']^3\,A^1_1\,A^2_1 + {A^2_1}^2 + 2\,\mathrm{Cos}[\theta']\,{A^2_1}^2 - 3\,\mathrm{Cos}[\theta']^2\,{A^2_1}^2 - 4\,\mathrm{Cos}[\theta']^3\,{A^2_1}^2 + 4\,\mathrm{Cos}[\theta']^4\,{A^2_1}^2\Big) \\
&\Big(4\,\mathrm{Sin}[\theta]^2\,{T^1_{\{-1,-1,-1\}}}^2 + 12\,\mathrm{Cos}[\theta]^2\,\mathrm{Sin}[\theta]^2\,{T^2_{\{-1,-1,-1\}}}^2 + 16\,{T^0_{\{-1,-1,0\}}}^2 + \\
&\quad 32\,\mathrm{Cos}[\theta]\,T^0_{\{-1,-1,0\}}\,T^1_{\{-1,-1,0\}} + 16\,\mathrm{Cos}[\theta]^2\,{T^1_{\{-1,-1,0\}}}^2 - 8\,T^0_{\{-1,-1,0\}}\,T^2_{\{-1,-1,0\}} + \\
&\quad 24\,\mathrm{Cos}[\theta]^2\,T^0_{\{-1,-1,0\}}\,T^2_{\{-1,-1,0\}} - 8\,\mathrm{Cos}[\theta]\,T^1_{\{-1,-1,0\}}\,T^2_{\{-1,-1,0\}} + \\
&\quad 24\,\mathrm{Cos}[\theta]^3\,T^1_{\{-1,-1,0\}}\,T^2_{\{-1,-1,0\}} + 2\,{T^2_{\{-1,-1,0\}}}^2 - 12\,\mathrm{Cos}[\theta]^2\,{T^2_{\{-1,-1,0\}}}^2 + 18\,\mathrm{Cos}[\theta]^4\,{T^2_{\{-1,-1,0\}}}^2 - \\
&\quad 16\,\mathrm{Cos}[\varphi]\,\mathrm{Sin}[\theta]\,T^0_{\{-1,-1,0\}}\,T^1_{\{-1,-1,1\}} - 8\,\mathrm{Cos}[\varphi]\,\mathrm{Sin}[2\,\theta]\,T^1_{\{-1,-1,0\}}\,T^1_{\{-1,-1,1\}} + \\
&\quad 4\,\mathrm{Cos}[\varphi]\,\mathrm{Sin}[\theta]\,T^2_{\{-1,-1,0\}}\,T^1_{\{-1,-1,1\}} - 12\,\mathrm{Cos}[\theta]^2\,\mathrm{Cos}[\varphi]\,\mathrm{Sin}[\theta]\,T^2_{\{-1,-1,0\}}\,T^1_{\{-1,-1,1\}} + \\
&\quad 4\,\mathrm{Sin}[\theta]^2\,{T^1_{\{-1,-1,1\}}}^2 - 8\sqrt{6}\,\mathrm{Cos}[\theta]\,\mathrm{Cos}[\varphi]\,\mathrm{Sin}[\theta]\,T^0_{\{-1,-1,0\}}\,T^2_{\{-1,-1,1\}} - \\
&\quad 8\sqrt{6}\,\mathrm{Cos}[\theta]^2\,\mathrm{Cos}[\varphi]\,\mathrm{Sin}[\theta]\,T^1_{\{-1,-1,0\}}\,T^2_{\{-1,-1,1\}} + \\
&\quad 4\sqrt{6}\,\mathrm{Cos}[\theta]\,\mathrm{Cos}[\varphi]\,\mathrm{Sin}[\theta]\,T^2_{\{-1,-1,0\}}\,T^2_{\{-1,-1,1\}} - \\
&\quad 12\sqrt{6}\,\mathrm{Cos}[\theta]^3\,\mathrm{Cos}[\varphi]\,\mathrm{Sin}[\theta]\,T^2_{\{-1,-1,0\}}\,T^2_{\{-1,-1,1\}} + 4\sqrt{6}\,\mathrm{Cos}[\theta]\,\mathrm{Sin}[\theta]^2\,T^1_{\{-1,-1,1\}}\,T^2_{\{-1,-1,1\}} + \\
&\quad 12\,\mathrm{Cos}[\theta]^2\,\mathrm{Sin}[\theta]^2\,{T^2_{\{-1,-1,1\}}}^2 + 4\,\mathrm{Cos}[\theta]\,\mathrm{Sin}[\theta]\,T^2_{\{-1,-1,-1\}} \\
&\qquad \Big(2\sqrt{6}\,\mathrm{Cos}[\varphi]\,T^0_{\{-1,-1,0\}} + 2\sqrt{6}\,\mathrm{Cos}[\theta]\,\mathrm{Cos}[\varphi]\,T^1_{\{-1,-1,0\}} - \sqrt{6}\,\mathrm{Cos}[\varphi]\,T^2_{\{-1,-1,0\}} + 3\sqrt{6}\,\mathrm{Cos}[\theta]^2 \\
&\qquad\quad \mathrm{Cos}[\varphi]\,T^2_{\{-1,-1,0\}} - \sqrt{6}\,\mathrm{Cos}[2\,\varphi]\,\mathrm{Sin}[\theta]\,T^1_{\{-1,-1,1\}} - 3\,\mathrm{Cos}[2\,\varphi]\,\mathrm{Sin}[2\,\theta]\,T^2_{\{-1,-1,1\}}\Big) - \\
&\quad 8\,\mathrm{Cos}[\varphi]\,\mathrm{Sin}[\theta]\,T^0_{\{-1,-1,0\}}\,T^2_{\{-1,1,-1\}} - 8\,\mathrm{Cos}[\theta]\,\mathrm{Cos}[\varphi]\,\mathrm{Sin}[\theta]\,T^0_{\{-1,-1,0\}}\,T^2_{\{-1,1,-1\}} - \\
&\quad 8\,\mathrm{Cos}[\theta]\,\mathrm{Cos}[\varphi]\,\mathrm{Sin}[\theta]\,T^1_{\{-1,-1,0\}}\,T^2_{\{-1,1,-1\}} - 8\,\mathrm{Cos}[\theta]^2\,\mathrm{Cos}[\varphi]\,\mathrm{Sin}[\theta]\,T^1_{\{-1,-1,0\}}\,T^2_{\{-1,1,-1\}} + \\
&\quad 4\,\mathrm{Sin}[\theta]^2\,T^1_{\{-1,-1,1\}}\,T^2_{\{-1,1,-1\}} + 4\,\mathrm{Cos}[\theta]\,\mathrm{Sin}[\theta]^2\,T^1_{\{-1,-1,1\}}\,T^2_{\{-1,1,-1\}} + \\
&\quad 2\,\mathrm{Sin}[\theta]^2\,{T^2_{\{-1,1,-1\}}}^2 + 4\,\mathrm{Cos}[\theta]\,\mathrm{Sin}[\theta]^2\,{T^2_{\{-1,1,-1\}}}^2 + 2\,\mathrm{Cos}[\theta]^2\,\mathrm{Sin}[\theta]^2\,{T^2_{\{-1,1,-1\}}}^2 + \\
&\quad 4\sqrt{6}\,\mathrm{Cos}[2\,\varphi]\,\mathrm{Sin}[\theta]^2\,T^0_{\{-1,-1,0\}}\,T^2_{\{-1,1,0\}} + 4\sqrt{6}\,\mathrm{Cos}[\theta]\,\mathrm{Cos}[2\,\varphi]\,\mathrm{Sin}[\theta]^2\,T^1_{\{-1,-1,0\}}\,T^2_{\{-1,1,0\}} - \\
&\quad 2\sqrt{6}\,\mathrm{Cos}[\varphi]\,\mathrm{Sin}[\theta]^3\,T^1_{\{-1,-1,1\}}\,T^2_{\{-1,1,0\}} - 2\sqrt{6}\,\mathrm{Cos}[\varphi]\,\mathrm{Sin}[\theta]^3\,T^2_{\{-1,1,-1\}}\,T^2_{\{-1,1,0\}} - \\
&\quad 2\sqrt{6}\,\mathrm{Cos}[\theta]\,\mathrm{Cos}[\varphi]\,\mathrm{Sin}[\theta]^3\,T^2_{\{-1,1,-1\}}\,T^2_{\{-1,1,0\}} + 3\,\mathrm{Sin}[\theta]^4\,{T^2_{\{-1,1,0\}}}^2 - \\
&\quad 8\,\mathrm{Cos}[3\,\varphi]\,\mathrm{Sin}[\theta]\,T^0_{\{-1,-1,0\}}\,T^2_{\{-1,1,1\}} + 4\,\mathrm{Cos}[3\,\varphi]\,\mathrm{Sin}[2\,\theta]\,T^0_{\{-1,-1,0\}}\,T^2_{\{-1,1,1\}} + \\
&\quad 8\,\mathrm{Cos}[\theta]^2\,\mathrm{Cos}[3\,\varphi]\,\mathrm{Sin}[\theta]\,T^1_{\{-1,-1,0\}}\,T^2_{\{-1,1,1\}} - 4\,\mathrm{Cos}[3\,\varphi]\,\mathrm{Sin}[2\,\theta]\,T^1_{\{-1,-1,0\}}\,T^2_{\{-1,1,1\}} + \\
&\quad 4\,\mathrm{Cos}[2\,\varphi]\,\mathrm{Sin}[\theta]^2\,T^1_{\{-1,-1,1\}}\,T^2_{\{-1,1,1\}} - 4\,\mathrm{Cos}[\theta]\,\mathrm{Cos}[2\,\varphi]\,\mathrm{Sin}[\theta]^2\,T^1_{\{-1,-1,1\}}\,T^2_{\{-1,1,1\}} + \\
&\quad 4\,\mathrm{Cos}[2\,\varphi]\,\mathrm{Sin}[\theta]^2\,T^2_{\{-1,1,-1\}}\,T^2_{\{-1,1,1\}} - 4\,\mathrm{Cos}[\theta]^2\,\mathrm{Cos}[2\,\varphi]\,\mathrm{Sin}[\theta]^2\,T^2_{\{-1,1,-1\}}\,T^2_{\{-1,1,1\}} - \\
&\quad 2\sqrt{6}\,\mathrm{Cos}[\varphi]\,\mathrm{Sin}[\theta]^3\,T^2_{\{-1,1,0\}}\,T^2_{\{-1,1,1\}} + 2\sqrt{6}\,\mathrm{Cos}[\theta]\,\mathrm{Cos}[\varphi]\,\mathrm{Sin}[\theta]^3\,T^2_{\{-1,1,0\}}\,T^2_{\{-1,1,1\}} + \\
&\quad 2\,\mathrm{Sin}[\theta]^2\,{T^2_{\{-1,1,1\}}}^2 - 4\,\mathrm{Cos}[\theta]\,\mathrm{Sin}[\theta]^2\,{T^2_{\{-1,1,1\}}}^2 + 2\,\mathrm{Cos}[\theta]^2\,\mathrm{Sin}[\theta]^2\,{T^2_{\{-1,1,1\}}}^2 + \\
&\quad 2\,T^1_{\{-1,-1,-1\}}\,\Big(2\sqrt{6}\,\mathrm{Cos}[\theta]\,\mathrm{Sin}[\theta]^2\,T^2_{\{-1,-1,-1\}} + 8\,\mathrm{Cos}[\varphi]\,\mathrm{Sin}[\theta]\,T^0_{\{-1,-1,0\}} + \\
&\qquad 4\,\mathrm{Cos}[\varphi]\,\mathrm{Sin}[2\,\theta]\,T^1_{\{-1,-1,0\}} - 2\,\mathrm{Cos}[\varphi]\,\mathrm{Sin}[\theta]\,T^2_{\{-1,-1,0\}} + 6\,\mathrm{Cos}[\theta]^2\,\mathrm{Cos}[\varphi]\,\mathrm{Sin}[\theta] \\
&\qquad\quad T^2_{\{-1,-1,0\}} - 4\,\mathrm{Cos}[2\,\varphi]\,\mathrm{Sin}[\theta]^2\,T^1_{\{-1,-1,1\}} - 2\sqrt{6}\,\mathrm{Cos}[\theta]\,\mathrm{Cos}[2\,\varphi]\,\mathrm{Sin}[\theta]^2\,T^2_{\{-1,-1,1\}} - \\
&\qquad 2\,\mathrm{Cos}[2\,\varphi]\,\mathrm{Sin}[\theta]^2\,T^2_{\{-1,1,-1\}} - 2\,\mathrm{Cos}[\theta]\,\mathrm{Cos}[2\,\varphi]\,\mathrm{Sin}[\theta]^2\,T^2_{\{-1,1,-1\}} + \sqrt{6}\,\mathrm{Cos}[3\,\varphi] \\
&\qquad\quad \mathrm{Sin}[\theta]^3\,T^2_{\{-1,1,0\}} - 2\,\mathrm{Cos}[4\,\varphi]\,\mathrm{Sin}[\theta]^2\,T^2_{\{-1,1,1\}} + 2\,\mathrm{Cos}[\theta]\,\mathrm{Cos}[4\,\varphi]\,\mathrm{Sin}[\theta]^2\,T^2_{\{-1,1,1\}}\Big)\Big)
\end{aligned}
$$