## **PSALTer results panel**

## Wave operator and propagator

		$^{\perp}$ . $\sigma^{\parallel}{}_{lphaeta}$			$^{1}$ . $\sigma^{1}{}_{\alpha\beta}$			¹. τ <sup>  </sup> αβ	В	$\stackrel{\scriptscriptstyle \perp}{\cdot} \sigma^{\scriptscriptstyle \parallel}{}_{lpha}$		1.0	$\sigma^{\scriptscriptstyle\perp}{}_{lpha}$	÷ τ'	<sup>1</sup> α	τ. τ	$\Gamma^{\perp}\alpha$	
$^{1^{+}}\sigma^{\parallel}$ † $^{lphaeta}$	$\frac{8(2\beta_{1} - \beta_{2})}{16(\beta_{1} - \beta_{2})(2\beta_{1} + \beta_{2}) + 4(\alpha_{2} - \alpha_{3} + 4\alpha_{4} - 4\alpha_{6})(2\beta_{1} - \beta_{2})(2\beta_{1} + \beta_{2}) + 10\beta_{2}(M_{Pl}^{2}) - (M_{Pl}^{2})^{2}}$			$-\frac{2\sqrt{2}(4\beta_{1}^{-}6\beta_{2}^{+}(\mathcal{M}_{\text{Pl}}^{2}))}{(1+k^{2})(16(\beta_{1}^{-}\beta_{2}^{-})(2\beta_{1}^{-}+\beta_{2}^{-})+4(\alpha_{2}^{-}\alpha_{3}^{-}+4\alpha_{4}^{-}4\alpha_{6}^{-})(2\beta_{1}^{-}\beta_{2}^{-})k^{2}-4\beta_{1}(\mathcal{M}_{\text{Pl}}^{2})+10\beta_{2}(\mathcal{M}_{\text{Pl}}^{2})-(\mathcal{M}_{\text{Pl}}^{2})^{2})}}$			$-\frac{1}{(1+k^2)(1}$	$2i\sqrt{2} k(4\beta6\beta)$ $(16(\beta\beta.)(2\beta.+\beta.)+4(\alpha\alpha.+4\alpha4\alpha.)(2\beta6\beta6\beta6\beta6\beta6\beta6\beta6\beta6\beta6\beta6$	$\frac{\beta_{2}^{1}+(\mathcal{M}_{Pl}^{2}))}{2\beta_{1}^{2}-\beta_{1}^{2})k^{2}-4\beta_{1}^{2}(\mathcal{M}_{Pl}^{2})+10\beta_{2}^{2}(\mathcal{M}_{Pl}^{2})-(\mathcal{M}_{Pl}^{2})^{2})}$	0		0			0 0			
$^{1^{+}}\sigma^{\scriptscriptstyle \perp}\dagger^{lphaeta}$	3	$\frac{2  2  3  4  6  1  2  1}{2  \sqrt{2} \left(4  \beta_1 - 6 \beta_2 + (M_{\text{Pl}}^2)\right)}$ $\beta_1 + \beta_2 - 4 \left(\alpha_2 - \alpha_3 + 4  4  4  \alpha_6 \right) \left(2  \beta_1 - \beta_2\right) k^2 + 4  \beta_1  (M_{\text{Pl}}^2 - \beta_2) k^2 + 4  \beta_2  (M_{\text{Pl}}^2 - \beta_2) k^2 + 4  \beta_3  (M_{\text{Pl}}^2 - \beta_3) k^2 + 4  \beta_4  (M_{\text{Pl}}^2 - \beta_4) k^2 + 4  (M_{\text{Pl}}^2 - \beta_4) k^2 + 4 $			$2(12 \beta_1 - 10 \beta_2 + 2(\alpha_1 - \alpha_1 + 4 \alpha_1 - 4 \alpha_1) k^2 + 2(\beta_1 + \beta_2) + 4(\alpha_1 - \alpha_1 + 4 \alpha_1 - 4 \alpha_1) (2 \beta_1 - \beta_2) k^2 - 4(\alpha_1 - \alpha_1 + 4 \alpha_1) (2 \beta_1 - \beta_2) k^2 - 4(\alpha_1 - \alpha_1 + 4 \alpha_1) (2 \beta_1 - \beta_2) k^2 - 4(\alpha_1 - \alpha_1 + 4 \alpha_1) (2 \beta_1 - \beta_2) k^2 - 4(\alpha_1 - \alpha_1 + 4 \alpha_1) (2 \beta_1 - \beta_2) k^2 - 4(\alpha_1 - \alpha_1 + 4 \alpha_1) (2 \beta_1 - \beta_2) k^2 - 4(\alpha_1 - \alpha_1 + 4 \alpha_1) (2 \beta_1 - \beta_2) k^2 - 4(\alpha_1 - \alpha_1 + 4 \alpha_1) (2 \beta_1 - \beta_2) k^2 - 4(\alpha_1 - \alpha_1 + 4 \alpha_1) k^2 - 4(\alpha_1 - \alpha_1 + 4 \alpha_$	-(M <sub>Pl</sub> <sup>2</sup> ))		$2i \ k(12\beta10\beta.+2(\alpha\alpha.+1) + 2i \ 2i \ k(12\beta10\beta.+2i) = 2i \ k(1$		0		(	0	0	)	C	0	
$^{1^{+}}\tau^{\parallel}\uparrow^{lphaeta}$	3	$\frac{1  2  2  3  4  6  1  2  1}{2 i \sqrt{2} k (4 \beta_1 - 6 \beta_2 + (M_{Pl}^2))}$ $\beta_1 + \beta_2) - 4(\alpha_2 - \alpha_1 + 4 \alpha_1 - 4 \alpha_1)(2 \beta_1 - \beta_2) k^2 + 4 \beta_1 (M_{Pl}^2)$			$\begin{array}{cccccccccccccccccccccccccccccccccccc$	+(M <sub>Pl</sub> <sup>2</sup> ))		$2k^{2}$ (12 $\beta$ 10 $\beta$ .+2( $\alpha$ $\alpha$ .+ $\alpha$ )		0		(	0	0	)	C	0	
$^{1}\sigma^{\parallel}$ † $^{\alpha}$	χ	0	2	1 2	0	2		0		$4(\frac{1}{12\beta_{1}+6\beta_{2}^{-3}(\mathcal{M}_{\mathbb{P} ^{2}})}+\frac{1}{6\beta_{1}+3(\beta_{2}+3\beta_{3}+(\mathcal{M}_{\mathbb{P} ^{2}}))+\frac{k^{2}\xi}{8}}$	3(1+2 \(\psi^2\)(4 \(\beta\)		$36(M_{Pl}^2) + k^2 \xi$	<u>,2 (5)</u> 0	) 3(1+2	$8i \ k(72 \beta. +36)$		1)++2 5)
$^{1}\sigma^{\scriptscriptstyle \perp}\dagger^{^{lpha}}$	χ	0			0			0		$\frac{4\sqrt{2}(72\beta_{3}+36(M_{Pl}^{2})+k^{2}\xi)}{3(1+2k^{2})(4\beta_{1}+2\beta_{2}-(M_{Pl}^{2}))(24(2\beta_{1}+\beta_{2}+3\beta_{3}+(M_{Pl}^{2}))+k^{2}\xi)}$	8(-	$\frac{1}{\frac{4\beta.+2\beta(M_{Pl}^2)}{1}} + \frac{8\beta}{8\beta}$	$\frac{24(2\beta_{1}+\beta_{2}+3\beta_{3}+(M_{\text{Pl}}^{2}))+k}{3}$ $\frac{1}{3,+4(\beta_{1}+3\beta_{3}+(M_{\text{Pl}}^{2}))+\frac{k^{2}\xi}{6}}$	0	n	$\frac{k^{2})(4 \beta_{1} + 2 \beta_{2} - (M_{Pl}^{2}))(2)}{8 i \sqrt{2} k (18(4 \beta_{1} + 2 \beta_{2} - (M_{Pl}^{2}))(2)}$ $\frac{k^{2})^{2} (4 \beta_{1} + 2 \beta_{2} - (M_{Pl}^{2}))(2)}{(4 \beta_{1} + 2 \beta_{2} - (M_{Pl}^{2}))(2)}$	$\beta_{1} + 4\beta_{1} + (M_{Pl}^{2})) + k^{2} \xi$	
$^{1}\tau^{\parallel}+^{\alpha}$	χ	0			0			0		0			+2 k <sup>2</sup> ) <sup>2</sup>	0		(		
$^{1}\tau^{\perp}\uparrow^{\alpha}$	α	0			0			0		$-\frac{8 i k(72 \beta_1 + 36 (M_{Pl}^2) + k^2 \xi)}{3(1+2 k^2)(4 \beta_1 + 2 \beta_2 - (M_{Pl}^2))(24(2 \beta_1 + \beta_2 + 3 \beta_3 + (M_{Pl}^2)) + k^2 \xi)}{3(1+2 k^2)(4 \beta_1 + 2 \beta_2 - (M_{Pl}^2))(24(2 \beta_1 + \beta_2 + 3 \beta_3 + (M_{Pl}^2)) + k^2 \xi)}$			$\beta_{2}+4\beta_{3}+(M_{Pl}^{2}))+k^{3}\xi)$ $(24(2\beta_{1}+\beta_{2}+3\beta_{3}+(M_{Pl}^{2}))+k^{3}\xi)$	$\frac{1}{(k^2 \xi)}$	)	$\frac{16 k^2 \left(\frac{1}{4 \beta_1 + 2 \beta_2 - (M_{\text{Pl}})^2}\right) + \frac{1}{8}}{3(1 + 2)^2 + \frac{1}{8}}$	$\frac{1}{\frac{3\beta_1+4(\beta_2+3\beta_3+(M_{Pl}^2))+\frac{\lambda^2\xi}{6}}})$ $2 k^2)^2$	
		$\overset{1^{+}}{\cdot}\mathcal{H}^{\parallel}{}_{\alpha\beta}$	$^{1^{+}}\mathcal{H}^{^{\perp}}{}_{\alpha\beta}$	$^{1^{+}}f\ _{\alpha\beta}$	${}^{\Gamma}_{\cdot}\mathcal{A}^{\parallel}{}_{lpha}$	$^{1}\mathcal{A}^{^{\perp}}{}_{lpha}$ $^{1}$	$f^{\parallel}_{\alpha}$	$^{1}f^{\perp}{}_{lpha}$		S +	0+f1+	+   F.	2 0 + a	N+ 1	2 All +	2+3911.		
${}^{1^{+}}\mathcal{H}^{\parallel}\dagger^{lphaeta}$	$\frac{1}{4} (12 \beta_{1} - 10 \beta_{2})$	$+2(\alpha_{1}-\alpha_{1}+4\alpha_{1}-4\alpha_{1})k^{2}+(M_{Pl}^{2}$	$\frac{4 \beta6 \beta. + (M_{Pl}^2)}{2 \sqrt{2}} \int_{-\frac{1}{2}}^{\frac{1}{2}}$	$\frac{\frac{1}{1} k(4 \beta6 \beta. + (M_{Pl}^{2}))}{2 \sqrt{2}}$	0	0 0		0		=		$\frac{1}{2}(2\beta)$	αβ <u>k (2)</u>	αβ	αβχ	$\uparrow^{\alpha\beta}$ $\frac{1}{4}$ (		
$^{1^{+}}\mathcal{A}^{\perp}\dagger^{lphaeta}$	β	$\frac{4\beta6\beta.+(M_{\rm Pl}^2)}{2\sqrt{2}}$	2 β β.	$i(2\beta_1 - \beta_1)k$	0	0 0		0		(Aaby		$\frac{1}{1} + \beta$ .	4(-3 α. 2 2 (2 β. +β.)( 1 2			(4 β. +2		
$f^{\parallel} \uparrow^{\parallel} \uparrow^{\alpha \beta}$	β	$-\frac{i  \frac{k(4  \beta_1 - 6  \beta_2 + (\mathcal{M}_{Pl}^2))}{2  \sqrt{2}}$	$-\bar{i}$ (2 $\beta_1$ - $\beta_2$ ) $k$	$(2 \beta_{1} - \beta_{1}) k^{2}$	0	0 0		0	$\beta$ . ((- $\alpha$ . ( $\partial$ $\alpha$ . ( $\partial$ $\alpha$ . ( $\partial$ $\alpha$ )	$\alpha_{\alpha\beta\chi}$ $\alpha_{\alpha\beta\chi}$ $\alpha_{\alpha}$	* A	+3 β. +	$\begin{array}{cccccccccccccccccccccccccccccccccccc$		2	$\frac{2}{2}\beta.+2$		
$^{1}\mathcal{A}^{\parallel}$ † $^{\prime}$	α	0	0	0	$\beta_1 + \frac{\beta_2}{2} + \beta_3 + \frac{(M_{\text{Pl}}^2)}{4} + \frac{k^2 \xi}{72}$	72 12	$0 - \frac{1}{72}i$	$i \ k(72  \beta_1 + 36  (M_{Pl}^2) + k^2  \xi)$	$\mathcal{A}_{IK\theta}$ $\mathcal{A}_{IK\theta}$ $\mathcal{A}_{IK\theta}$ $\mathcal{A}_{IK\theta}$ $\mathcal{A}_{IK\theta}$ $\mathcal{A}_{IK\theta}$ $\mathcal{A}_{IK\theta}$ $\mathcal{A}_{IK\theta}$	+ f <sup>a\beta</sup> ; + f <sup>a\beta</sup> ; - A <sup>\text{i}</sup> , A - A <sup>\text{i}</sup> ,	$(2\beta.+\beta.+3)$ $\sqrt{2}$ 0	0 <sup>+</sup> ς 4(3 α.	4α.) κ²+(λ 6 β.+2β(λ 12 +4α4α.) 0	σ <sup>  </sup> αβ	-	(-3 α, +	. 2,	
¹ <i>Я</i> ⁺†'	α	0	0	0	$-\frac{72\beta_{1}+36(M_{Pl}^{2})+k^{2}\xi}{72\sqrt{2}}$	$\beta_{1} + \frac{\beta_{1} + \beta_{3}}{2} + \frac{k^{2} \xi}{144}$	0	$\frac{i \ k(72(2 \ \beta_1 + \beta_2 + \beta_3) + k^2 \ \xi)}{72 \ \sqrt{2}}$	$\begin{array}{c} -2 \ \partial f_{\epsilon} \\ (3 \ \mathcal{A}^{16} \\ (3 \ \mathcal{A}^{16} \\ 0 \ \partial \partial f \\ \partial^{\lambda} \mathcal{A}^{\theta \kappa} \\ \partial^{\lambda} \mathcal{A}^{\theta \kappa} \end{array}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	3 \( \begin{align*} 3 \\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Α <sup>  </sup> + α α	$(4p_1^2)(2 - \frac{1}{2p_1^2})$ $(4p_1^2))$ $(4p_1^2)$	S (X	0	3 (M <sub>F</sub>	$\mathcal{A}_{\alpha\beta}$	
<sup>1</sup> f <sup>  </sup> † '	_	0	0	0	$\frac{1}{72} i \ k(72 \beta_3 + 36 (M_{Pl}^2) + k^2 \xi$	$ \begin{array}{c c} 0 & 0 \\  & i \ k(72(2 \beta.+\beta.+\beta.)+k^2 \xi) \\  & 1 & 2 & 3 \end{array} $	0	0	$\frac{\partial}{\partial x} + \frac{\partial}{\partial y} \int_{0}^{y} dx + \frac{\partial}{\partial $	$\begin{array}{c} \partial_{\alpha\beta} - \frac{1}{2} \\ \partial_{\alpha\beta} - \frac{1}{2} \\ \partial_{\alpha\beta} \partial_{\alpha\beta}$		$\begin{pmatrix} 1 & +\alpha & 1 \\ 4 & 6 \end{pmatrix}$	$+(M_{\rm Pl}^2)^2$	<sup>12</sup> )		α. +4 α 4		
			0	0		72 √2	0	$(2\beta_1 + \beta_2 + \beta_3)k^2 + \frac{k^4\xi}{72}$	$\frac{1}{(K+\delta_K)} + \frac{1}{2} \frac{1}{(K+\delta_K)} + \frac{1}{2} \frac{1}{(K+\delta_K)} = \frac{1}{2} \frac{1}$	$\mathcal{M}_{Pl}^{2}$ ) $K + 2$ $\int_{K} + 2$ $\int_{\partial \mathcal{F}} d^{10} - 2$ $\int_{\partial \mathcal{F}} a_{ijk}$ $\partial_{ij} \mathcal{F}_{ajk}$ $\partial_{ij} \mathcal{F}_{ajk}$		k² +( /\	k (4(3)			) k² -(,		
$\frac{Spin-p}{0^+\tau^+} = =$	parity form Co 0	Variant form $\partial_{\beta}\partial_{\alpha}\tau \left(\Delta + \mathcal{K}\right)^{\alpha\beta} == 0$			Multiplicities 1				$(\theta_{i}) \partial^{k} f$ $(\theta_{i}) \partial^{k} f$ $(\theta_{i}) \partial^{k} f$ $(\theta_{i}) \partial^{k} g f$ $(\theta_{i}) \partial^{k} f$	7.10 0.65 9.6 x 9.6 x 9.7 x 9.7 x 9.7 x 9.7 x 9.8 x		(PI <sup>2</sup> ))	α. α. +4 α 2 3 2(4 β. + 2 α. α. +4 α 2 3			M <sub>PI</sub> <sup>2</sup> ))		
2 i k1	$\sigma^{\perp \alpha} + \frac{1}{i} \tau^{\perp \alpha} == 0$	$\partial_{\chi}\partial_{\beta}\partial^{\alpha}\tau\left(\Delta+\mathcal{K}\right)^{\beta\chi} == \partial_{\chi}\partial^{\chi}\partial_{\beta}\tau\left(\Delta+\mathcal{K}\right)$		3αχ	3				$^{(\theta)}\mathcal{A}_{\lambda}^{(\theta)}$	θ <sup>β</sup> +2 θ θ <sup>β</sup> +2 θ θ +2 θ θ +2 θ	(2 β. + <sub>1</sub>	i κ(2β.+μ	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2i √2		i κ(4β	. 21	
<sup>1</sup> τ" α		$\partial_{\chi}\partial_{\beta}\partial^{\alpha}\tau \left(\Delta + \mathcal{K}\right)^{\beta\chi} == \partial_{\chi}\partial^{\chi}\partial_{\beta}\tau \left(\Delta + \mathcal{K}\right)$			3				$\frac{\partial}{\partial x} \left( \frac{\partial}{\partial x} \right)$	0 0 0 0 0 0 0 0 0 0 0 0 0 0	+3	$0^{+}f\ $ $\frac{3+3\beta+1}{2}$ $\sqrt{2}$	$\frac{\beta_{1} + \beta_{2}}{x_{1}} \times \frac{\beta_{2}}{x_{2}} \times \frac{\beta_{3}}{x_{3}} \times \frac{\beta_{3} + \beta_{3}}{x_{2}} \times \frac{\beta_{3}}{x_{3}} \times \frac{\beta_{3} + \beta_{3}}{x_{3}} \times \frac{\beta_{3}}{x_{3}} \times \frac{\beta_{3} + \beta_{3}}{x_{3}} \times \frac{\beta_{3} + \beta_{3}}{x_{3}} \times \frac{\beta_{3}}{x_{3}} \times $	$(4 \beta_1 + 2)$	0	$\begin{array}{c} +2\beta \cdot (M_{\text{Pl}}) \\ +2\beta \cdot \sqrt{2} \\ +\beta \cdot ) k^2 \end{array}$	<sup>+</sup> f   αβ	
i k1*σ	$\tau^{\perp \alpha \beta} + \frac{1}{\tau} \ ^{\alpha \beta} == 0$	$\begin{array}{c} \partial_{\chi}\partial^{\alpha}\tau\left(\Delta+\mathcal{K}\right)^{\beta\chi} + \partial_{\chi}\partial^{\beta}\tau\left(\Delta+\mathcal{K}\right)^{\chi\alpha} +\\ \\ \partial_{\chi}\partial^{\chi}\tau\left(\Delta+\mathcal{K}\right)^{\alpha\beta} + 2 \partial_{\delta}\partial_{\chi}\partial^{\alpha}\sigma^{\chi\beta\delta} \end{array}$		=	3				$^{\theta\kappa}$ +2 $\theta^{\kappa}$ ) + $^{\frac{1}{72}}$ $\xi$ (-2) $\mathcal{A}^{\lambda}_{\theta\lambda}$ ( $\partial^{\kappa}\mathcal{S}^{\lambda}_{\lambda}$ ) - $\partial^{\kappa}\partial^{\theta}f'_{\lambda}$ $\alpha_{\delta}^{\lambda}\partial_{\lambda}\mathcal{A}_{\delta}$	0 , -2 f 18 , -2 f 18 , -3 A and , -3 A and	<b>₹</b> 2	(M <sub>Pl</sub> <sup>2</sup> ))	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	8. (Mp²))	β.	(2 (2))		
		$\partial_{\chi}\partial^{\alpha}\tau \left(\Delta + \mathcal{K}\right)^{\chi\beta} + \partial_{\chi}\partial^{\beta}\tau \left(\Delta + \mathcal{K}\right)^{\alpha\chi}$			;				2 8 <sup>k</sup> f <sup>16</sup> ); ; (-2 8,3; (8 <sup>k</sup> 3 <sup>16</sup> , 8 <sup>6</sup> f', 8 <sub>1</sub> 8	4 b.  3 8 9 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8	0	0 0	3.)(M <sub>Pl</sub> <sup>2</sup> ) 2 k <sup>2</sup> -(M <sub>Pl</sub> <sup>2</sup> ) 8.)(M <sub>Pl</sub> <sup>2</sup> )		$+\frac{\beta}{2}$ -(		2 <sup>-</sup> 9	
Totale	expected gauge <u>c</u>		0+	_11	0+-1 0 -1				+ + \(\delta^{\lambda}\)- \(\delta^{\lambda}\)- \(\delta^{\lambda}\)	$\frac{3.4  \beta.}{1}$ $\frac{6}{9} + 2  f$ $\frac{7}{9}  f^{\text{K}} - 2$ $\frac{7}{9}  f^{\text{K}} - 2$			$+(M_{Pl}^2)^2)$		$\frac{\alpha}{2}$ $k^2 - \frac{1}{2}$	0 0	aß <sub>X</sub>	
<sup>0+</sup> σ <sup>  </sup> †		$\frac{0^{+}\sigma^{\parallel}}{\frac{1}{2(3\frac{\alpha_{1}+\alpha_{2}-\alpha_{1}+\alpha_{2}}{4})k^{2}+\frac{1}{2}(M_{\text{Pl}}^{2})(-1-\frac{(M_{\text{Pl}}^{2})}{2\beta_{1}+\beta_{2}+3\beta_{3}})}}{\frac{i\sqrt{2}(2\beta_{1}+\beta_{2}+3\beta_{3}+(M_{\text{Pl}}^{2}))}{k(-4(3\frac{\alpha_{1}+\alpha_{2}-\alpha_{1}+\alpha_{2}}{4})(2\beta_{1}+\beta_{2}+3\beta_{3})k^{2}+(2\beta_{1}+\beta_{2}+3\beta_{3})(M_{\text{Pl}}^{2})+(M_{\text{Pl}}^{2})^{2})}} = \frac{i\sqrt{2}(2\beta_{1}+\beta_{2}+3\beta_{3}+(M_{\text{Pl}}^{2}))}{k(-4(3\frac{\alpha_{1}+\alpha_{2}-\alpha_{1}+\alpha_{2}}{4})(2\beta_{1}+\beta_{2}+3\beta_{3})k^{2}+(2\beta_{1}+\beta_{2}+3\beta_{3})(M_{\text{Pl}}^{2})+(M_{\text{Pl}}^{2})^{2})}}{0} = 0$					ور ) - عمر ال	$+2(\alpha)$ $-2^{\theta}f'_{1}\partial_{x}\mathcal{A}^{\theta}$ $+$		0 3	-4β2β 1		<u>(Mp²)</u> 4 2					
$0^+\tau^{\parallel}+\frac{1}{k}$	i √2(2 β. 1	$+\beta.+3\beta.+(M_{Pl}^2))$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$+\alpha\alpha.+\alpha.)k^2+(M_{Pl}^2)$						+5 a.) **  ***  ***  ***  ***  **  **  **  **		<b>7</b>	0 0 (+4 \alpha. k^2 + \begin{pmatrix} 4 & & & & & \\ 2 & & 2 & & & & \\ 2 & & & 2 & & & \\ 2 & & & &	Q	-			
0 <sup>+</sup> τ <sup>±</sup> †	1 2 3	0	0		0 0					2			У <sub>Р</sub> 2)					
°. σ∥ †		0	0		$0  \frac{2}{8\beta8\beta.+4(\alpha.+3\alpha)}$	$\frac{\alpha_{\star}) k^2 + (\mathcal{M}_{\rm Pl}^2)}{4}$					ž							

## Massive and massless spectra

$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Spin: 1 Parity: Even	Pole residue: $\alpha_2$			Pole residue: $\begin{pmatrix} 4 & \alpha \\ & & $		Spin: 2 Parity: Even	Square mass: $\frac{(4\beta_{i})^{2}}{4(3\alpha_{i})^{2}}$	Poleresidue: $\frac{3\alpha_{c}(4\beta_{c})}{2}$		?	$J^{P} = 1^{-}$ $k^{\mu} = (\mathcal{E}, 0, 0, p)$	?	? $k^{\mu} = (p, 0, 0, p)$ ?
Pole residue:					$\beta_{4} + 4$ 2 c 6 c 2 (3 $\alpha_{1}$ 2)(2 $\beta_{1} + 4$		ω	+2β (/ 1 2 α +4α	1β.+2β.			Massive particle		Massless particle
article article $ \begin{array}{cccccccccccccccccccccccccccccccccc$		-80 $\beta$ ,		6 1 2	$\begin{array}{cccccccccccccccccccccccccccccccccccc$		6	$M_{P_l}^2))(M_{P_l}^2)$ $M_{\alpha}^2)(2\beta + i)$	( <sup>2</sup> ))+a		Pole residue	$(96\beta. + 48\beta. + 144\beta. + 4$	8( M <sub>Pl</sub> <sup>2</sup> )-ξ) ξ	()M(pi-)
article article $ \begin{array}{cccccccccccccccccccccccccccccccccc$		+44 $\beta$ . 30 $\beta$ . $\beta$ . 30 $\beta$ . $\beta$ 80 $\beta$ 80 $\beta$ . 1 2 4 $\alpha$ .)(2 3 3 3 3 1 4 1 6 $\beta$ -4 $\alpha$ .)(2 $\beta$ :	? ?		ν 6 ω 6 α 2 <sup>3</sup>	? ?	2	V	$(4\beta + 2\beta - 1)^{-1}$	? ?		$:: -\frac{\frac{24(2 \beta. + \beta. + 3\beta. + (M_{Pl})^2}{1 2 3}}{\xi}$	<del>-</del> >0	
article article $ \begin{array}{cccccccccccccccccccccccccccccccccc$	1	2+8 β +44 β 8. +44 β 8. +44 β 9. +46 β 9. +6 β 16 β 17	Mas		β. β.	Mas Kr			Mas (M <sub>Pl</sub> ²))-2	**************************************		1 Odd		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		2)-12 $\beta$ ; ( $M_{Pl}^{2}$ ) $\beta$ ; ( $M_{Pl}^{2}$ )-12 $\beta$ $\beta$ ; ( $M_{Pl}^{2}$ )-12 $\beta$ $\beta$ $\beta$ ; ( $M_{Pl}^{2}$ )-12 $\beta$ $\beta$ ; ( $M_{Pl}^{2}$ )-12 $\beta$ ; ( $M_{Pl}^{2}$ )-( $M_{Pl}^{2}$ ) $\beta$ ; ( $M_{Pl}^{2}$ )-1 $\beta$ ; ( $M_{Pl}^{2}$ )-1 $\beta$ ; ( $M_{Pl}^{2}$ )-1	$P = 1^{+}$ ? ive particle		${}^{4}_{43}$ , ${}^{6}_{3}$ , ${}^{6}_{63}$ , ${}^{6}_{3}$ , ${}^{6}_{43}$ , ${}^{6}$	P = 0?		2 3 4 6 1 1 2 7 7 7 7 PP   7	particle 38α.β.+4α.β4 1.6.1.4.2 1.6.	$P = 2^{+}$ $= (\mathcal{E}, 0, 0, p)$	<u></u> ≫-	?	×	••••• ?
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		(Mpl <sup>2</sup> ) Mpl <sup>2</sup> ) + (Mpl <sup>2</sup> ) (Mpl <sup>2</sup> ) (Mpl <sup>2</sup> ) (Mpl <sup>2</sup> ) (Mpl <sup>2</sup> ) (Mpl <sup>2</sup> ) (Mpl <sup>2</sup> )			+ 3				. (Mpl <sup>2</sup> )+		Massi	ve particle	Mas	sive particle
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		$(A, \beta,, $			(M <sub>Pl</sub> <sup>2</sup> )						Pole residue:	$-\frac{1}{\frac{2(\alpha.+3\alpha.)}{2}} > 0$	Poleresidue	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		<sup>2</sup> / <sub>2</sub> )+ μ <sup>2</sup> / <sub>2</sub> )- μ <sup>2</sup> / <sub>2</sub> )- ( M <sub>Pl</sub> <sup>2</sup> ))- ( M <sub>Pl</sub> <sup>2</sup> / <sub>2</sub> )			₩ +				$^{2})+2\beta.(M_{1})$		Square mass	$:: -\frac{\frac{8\beta8\beta.+(M_{Pl}^2)}{\frac{1}{2}}}{\frac{4(\alpha.+3\alpha.)}{\frac{2}{4}}} > 0$	Square mas	s: $\frac{\frac{4\beta.+2\beta(M_{Pl}^2)}{2}}{\frac{4\alpha.}{2}} > 0$
Parity: Odd Parity: Odd		V + €							$\beta_1^2) + \beta_2$			0		2
									(M <sub>Pl</sub> <sup>2</sup> ))		Parity:	Odd	Parity:	Odd

## **Unitarity conditions**

(Demonstrably impossible)