21st October, 1974.

Dr. M. Jones,
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Dear Dr. Jones,

Thanks for your letter of 13 October 1974. We think we can answer all your questions.

i) The relation

\[
(\text{\texttt{15}\,^1\texttt{T}_{\texttt{189}}}^{\texttt{GR}}) = -\frac{12}{5}(\text{\texttt{15}\,^1\texttt{T}_{\texttt{189}}}^{\texttt{HD}})
\]

is correct, as given in our earlier letter. What is wrong is that the sign of the corresponding entry under the heading "Separate" in our Table 4 was printed incorrectly (it was given correctly in the preprint). This should read +5.3. Then \(N_4\) and \(N_6\) given on p.1 of your letter in terms of our \(<T>\) then have the values you need to reproduce Horgan's mass values.

ii) The explanation of your discrepancy for the (\texttt{5-}) octet masses is that your expressions for \(N_9\) and \(N_{10}\) in terms of our \(<T>\) are incorrect. Let us derive the expressions:

\[
N_9 (T_{L.S}^8)^{GR} + N_{10} (T_{L.S}^8, 189)^{GR} = -6N_9 (T_{35}^{15,8,3})^{HD} + N_{10} (6(T_{35}^{15,8,3})^{HD} - 9(T_{189}^{15,8,3}))^{HD}
\]

\[
= \langle 15,8,3 \rangle_{35}^{HD} + \langle 15,8,3 \rangle_{189}^{HD}
\]

Hence

\[
N_9 = -\frac{1}{6} \langle 15,8,3 \rangle_{35}^{HD} - \frac{1}{9} \langle 15,8,3 \rangle_{189}^{HD},
\]

\[
N_{10} = -\frac{1}{9} \langle 15,8,3 \rangle_{189}^{HD}.
\]

These take the values

\[
N_9 = -45.9 + 29.9 = -16.0
\]

\[
N_{10} = 29.9
\]

These changes do increase \((2N_9 + N_{10})\) by 14 MeV from the value you have. This puts your calculations for the (\texttt{5-}) octet masses into agreement with those in section A.1 of Horgan's paper (apart from the rounding-off errors, which might amount to at least \(\pm 0.5\) in the final sum).
We are glad to have your letter and to make these checks. They help to detect misprints and give us more confidence in the arithmetic correctness of what is printed in our papers.

Finally, let us give you the parameter values when the $L = 0^+_{0}$ parameters are held at the values given in Table 2 of Horgan's paper, which are the best-fit values. With these $L = 0^+_{0}$ parameter values, the fit to the Combined Data ($L=1^+$ and both $L = 2^+_2$ supermultiplets) is significantly better; the sum $F = 2323$ (for the $L = 1^+$ fit) + 4512 (for the $L = 2^+_2$ fit) = 6835 given in Table 4 then falls to 6251. The corrected parameter values, given in the sequence of tabulation in Table 4, are as follows:

$m = 21, L = 2^+_2$: 1866.9, 7.1, 48.8, -9.3.

$m = 15, L = 1^+_1$: 2164.3, 106.1, -15.7, -20.9, 237.3, +8.5, -190.0.

We give the + sign only where the final sign differs from that of Table 4. We shall enclose two sheets giving the "Fit Values" corresponding to the corrected parameter values.

Yours sincerely,

\[ \text{R. H. Dalitz} \quad \text{R. R. Horgan} \]