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Corrigendum

Corrigendum to "Generalization of the Haldane conjecture to SU(3) chains" [Nucl. Phys. B 924 (2017) 508–577]

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In [1], SU(3) chains in the rank-p symmetric representation were considered. By mapping these chains to a flag manifold nonlinear sigma model, the authors proposed a generalization of Haldane's conjecture to SU(3): when p is a multiple of 3, the chain should have a gapped ground state; otherwise, the chain should exhibit gapless excitations.

In this erratum, we first acknowledge a second contribution of Bykov, [2] who was the first to derive these flag manifold sigma models in the context of SU(n) chains. We were unaware of this publication when we wrote our paper. Next, we correct the calculation of the renormalization group beta functions occurring in Section 6 of [1]:

- In Eq. (F.75), a factor of 2 is missing in the terms proportional to λg.
- In Eq. (F.79), the third line should have a negative sign instead of a positive sign.

These errors propagate, resulting in a new beta function for λ:

$$\beta_\lambda = \frac{3}{2\pi} g\lambda \tag{1}$$

which should be compared with $\beta_\lambda = \frac{9g\lambda}{4\pi}$ in Eq. (6.8) in [1]. This correction changes the sign of the $\tilde{\lambda}$ beta function from positive to negative:

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$$\beta_{\tilde{\lambda}} = -\frac{3}{8\pi}\tilde{\lambda} < 0 \tag{2}$$

This corrected result agrees with the beta function (6.11) found in [3]. Despite the fact that λ is relevant near small coupling, there are still no relevant operators present in the $SU(3)_1$ WZW model. Therefore, if λ is initially small, we may still expect the flag manifold sigma model to flow to the $SU(3)_1$ critical point [3].

Finally, we also note the following typos:

- Eq. (4.4): the transpose sign was missing for the ϕ_2 and ϕ_3 fields.
- Fig. 5a: The n values should have the opposite sign, since the y axis actually shows $-\theta_3$.
- Eq. (D.12): the formula for S_2 in the $\mathcal{O}(a^2/p)$ term $|L_{13}|^2$ should be $|L_{12}|^2$.
- Eq. (D.15): all the J_3 terms should appear with a negative sign. Also in the same equation in the $J_2|\vec{\Phi}_2^*(j)\cdot\vec{\Phi}_3(j)|^2$ term the argument of $\vec{\Phi}_3$ should be $(j-1)$.
- Eq. (D.17): a factor of 2 is missing in the second term on the right. In Eq. (D.21), it is correct.
- On page 530, ortherwise should be otherwise.
- The dot for scalar product was missing from Eqs. (D.16), (D.17), (D.18), and in one place in Eq. (D.25).

References

[1] M. Lajko, K. Wamer, F. Mila, I. Affleck, Nucl. Phys. B 924 (2017) 508.
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[3] K. Ohmori, N. Seiberg, S.H. Shao, SciPost Phys. 6 (2019) 017.