Erratum: Stability of holographic confinement with magnetic fluxes [Phys. Rev. D 111, 066009 (2025)]

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In Ref. [1], the sign in the second term of Eq. (60), providing the fluctuation equations for the vector sector, should be changed, so that the equation reads as follows:

$$0 = \left[\frac{M^2}{\varrho} - 4\varrho\mathcal{A}_6'(\varrho)^2 + 2(f(\varrho)+\varrho f'(\varrho))\partial_\varrho + \varrho f(\varrho)\partial_\varrho^2\right] P^{\mu\nu}\tilde{V}_\nu + [4\varrho\mathcal{A}_6'(\varrho)\partial_\varrho]\, P^{\mu\nu}\tilde{A}_\nu. \tag{60}$$

This change affects the numerical results of the spectrum of spin-1 states, and Fig. 2 should be revised accordingly. The revised figure is shown in Fig. 2.

The missing minus sign in Eq. (60) for the vector fluctuations requires amending a few of the intermediate results presented in Appendix B, and in Appendix C. Equation (B9) should read as follows:

$$\begin{aligned}
\mathcal{S}_5^{(V)} = \int \mathrm{d}^4q\mathrm{d}\rho\Bigg\{ & -\frac{H_{ab}e^{\frac{\chi}{\sqrt{6}}}}{2}\tilde{V}_\mu^a(-q)\left(q^2P^{\mu\nu}+\frac{1}{\xi}q^\mu q^\nu\right)\tilde{V}_\nu^b(q) \\
& + \frac{1}{2}\tilde{V}_\mu^a(-q)\left(P^{\mu\nu}+\frac{q^\mu q^\nu}{q^2}\right)\left[\partial_\rho\left(H_{ab}e^{2A-\frac{1}{\sqrt{6}}\chi}\partial_\rho\tilde{V}_\nu^b(q)\right)\right] \\
& - \frac{1}{2}e^{2A}e^{\frac{1}{\sqrt{6}}\chi}\tilde{V}_\mu(-q)\left(P^{\mu\nu}+\frac{q^\mu q^\nu}{q^2}\right)\tilde{V}_\nu(q)(\partial_\rho A_6)^2 \\
& + \frac{1}{2}e^{2A}\partial_\rho\mathcal{A}_6 e^{\frac{1}{\sqrt{6}}\chi}\left[\tilde{V}_\mu(-q)\left(\left(P^{\mu\nu}+\frac{q^\mu q^\nu}{q^2}\right)\partial_\rho\tilde{\mathcal{A}}_\nu(q)\right)+(q\leftrightarrow -q)\right] \\
& - \frac{\xi e^{-\frac{1}{\sqrt{6}}\chi}}{2H_{ab}}\partial_\rho(H_{ab}e^{2A}\tilde{V}_5^a(-q))\partial_\rho(H_{ab}e^{2A}\tilde{V}_5^b(q)) \\
& - 2\xi(e^{2A}\partial_\rho\mathcal{A}_6 6)^2 e^{-\frac{5}{\sqrt{6}}\chi}\tilde{A}_5(q)\tilde{A}_5(-q) \\
& - \frac{\xi}{2}\left(\frac{1}{H_{ab}}\partial_\rho(H_{ab}e^{2A}\tilde{V}_5(-q))\partial_\rho\mathcal{A}_6 6e^{2A+\frac{1}{\sqrt{6}}\chi}\tilde{A}_5(q)+(q\leftrightarrow -q)\right)\Bigg\}.
\end{aligned} \tag{B9}$$

Equation (B12) should read as follows:

$$0 = \left[e^{-2A+\frac{2}{\sqrt{6}}\chi}M^2 - 4e^{-\sqrt{6}\chi}(\partial_\rho\mathcal{A}_6 6)^2 + \left(\frac{7}{\sqrt{6}}\chi'+2A'\right)\partial_\rho+\partial_\rho^2\right]P^{\mu\nu}\tilde{V}_\nu + \left[4e^{-\sqrt{6}\chi}\partial_\rho\mathcal{A}_6\partial_\rho\right]P^{\mu\nu}\tilde{A}_\nu. \tag{B12}$$

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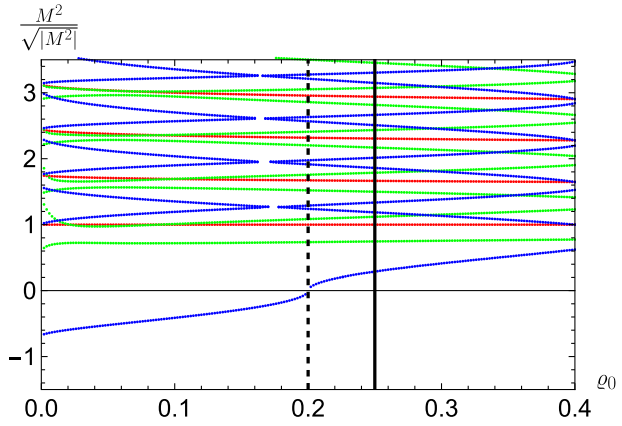


FIG. 2. Mass spectra, $M^2/\sqrt{|M^2|}$, for spin-0 (blue), spin-1 (green), and spin-2 (red) fluctuations. All masses have been normalized to the lightest spin-2 state. In the numerics an IR cutoff $\varrho_1 = 10^{-7}$ and UV cutoff $\varrho_2 = 15$ were used. We see the presence of modes with negative M^2, appearing in the spin-0 sector for values of the labeling parameter ϱ_0 smaller than the one marked by the black dashed line, which corresponds to the turning point of the free energy. The solid, vertical black line corresponds to the position of the phase transition, stable solutions having ϱ_0 larger than the critical value.

The IR expansions reported in in Eqs. (C3) and (C4) should be replaced with the following expressions:

$$\begin{aligned}\tilde{A}_{\mathrm{IR}}(\varrho) &= \tilde{A}_{\mathrm{IR},0} + \tilde{A}_{\mathrm{IR},L}\log(\varrho-\varrho_0)\\ &+\frac{(\varrho-\varrho_0)}{2\varrho_0^6}\Big[-\tilde{A}_{\mathrm{IR},0}M^2\varrho_0^4 + 2\tilde{A}_{\mathrm{IR},L}M^2\varrho_0^4\\ &+22\tilde{A}_{\mathrm{IR},L}\varrho_0^5 - 60\tilde{A}_{\mathrm{IR},L}\varrho_0^6 - \sqrt{2\varrho_0^7(2-5\varrho_0)}\Big(2\tilde{V}_{\mathrm{IR},0}\varrho_0^2 + \tilde{V}_{\mathrm{IR},-1}(M^2+2\varrho_0(10\varrho_0-7)\Big)\\ &+\log(\varrho-\varrho_0)\Big(-\tilde{A}_{\mathrm{IR},L}\varrho_0^4(M^2+8(2-5\varrho_0)\varrho_0) + \sqrt{2}\tilde{V}_{\mathrm{IR},-1}\sqrt{\varrho_0^7(2-5\varrho_0)}\Big)\Big] + \mathcal{O}(\varrho-\varrho_0)^2, \end{aligned} \tag{C3}$$

$$\begin{aligned}\tilde{V}_{\mathrm{IR}}(\varrho) &= \frac{\tilde{V}_{\mathrm{IR},-1}}{\varrho-\varrho_0} + \tilde{V}_{\mathrm{IR},0} + \frac{\log(\varrho-\varrho_0)}{2\varrho_0^4}\Big(-\tilde{V}_{\mathrm{IR},-1}(M^2\varrho_0^2) + 4\sqrt{2}\tilde{A}_{\mathrm{IR},L}\sqrt{\varrho_0^7(2-5\varrho_0)}\Big)\\ &+\frac{(\varrho-\varrho_0)}{48\varrho_0^6}\Big[\tilde{V}_{\mathrm{IR},-1}\varrho_0^2(-9M^4 + 12M^2(-11+30\varrho_0)\varrho_0 + 32\varrho_0^2(31+10\varrho_0(-13+15\varrho_0))) +\\ &-12\Big(\tilde{V}_{\mathrm{IR},0}\varrho_0^4M^2 + 2\sqrt{2}\sqrt{(2-5\varrho_0)\varrho_0^7}(\tilde{A}_{\mathrm{IR},0}M^2 - 4\tilde{A}_{\mathrm{IR},L}(M^2+6\varrho_0-20\varrho_0^2))\Big)\\ &+6M^2\log(\varrho-\varrho_0)\Big(\tilde{V}_{\mathrm{IR},-1}\varrho_0^2 - 8\tilde{A}_{\mathrm{IR},L}\sqrt{2(2-5\varrho_0)\varrho_0^7}\Big)\Big] + \mathcal{O}(\varrho-\varrho_0)^2. \end{aligned} \tag{C4}$$