

Erratum: Constructing nonrelativistic $\text{AdS}_5/\text{CFT}_4$ holography [Phys. Rev. D **111**, 026003 (2025)]

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First, we would like to correct a statement in the section “Dilaton.” The correct condition to impose is that the Lie derivative of e^ϕ is proportional to e^ϕ . Since the nonrelativistic dilaton ϕ vanishes, this implies that the constant of proportionality needs to vanish as well, which corresponds to the condition $\omega = 0$. Then we notice that the parameter ω only enters in the condition Eq. (3.3a). This means that the Killing vectors need to fulfil Eq. (3.3a) with $\omega = 0$, namely their Lie derivatives of $\tau_{\mu\nu}$ has to vanish. We checked that this is actually the case for the whole set of Killing vectors given in (3.33). Therefore, our result regarding identifying the symmetries of the supergravity solution remains unchanged.

The second correction regards the identification of the dual gauge theory. The proposed nonrelativistic AdS/CFT correspondence was initially based on matching the on-shell symmetries of the Galilean electrodynamics (GED) theory computed in [1] with the Killing vectors of the nonrelativistic string theory. Recently, the symmetries of the GED theory have been revisited in [2]. It has been found that most of what were identified in [1] as on-shell symmetries are actually fully off-shell symmetries. Furthermore, it has been found in [2] that the number of symmetries of the GED theory with five free scalars given in Eq. (2.33) is larger than the number of Killing vectors found for the bulk theory. For this reason, the proposed GED theory with five free scalars cannot be the holographic dual candidate.

As we discussed in the section “An alternative nonrelativistic limit,” there is a second consistent nonrelativistic limit that one can take on the gauge theory side. This leads to a Galilean Yang-Mills (GYM) theory with five non-Abelian interacting scalars, whose Lagrangian is given in Eq. (2.42). The symmetries of this theory have been carefully analyzed in [2], and they have been proven to be in a one-to-one correspondence with the Killing vectors evaluated at the Penrose boundary of the bulk supergravity solution. This contrasts with our earlier intuition that flattening the five-sphere pointed to the Abelian theory as the holographic dual.

In light of recent developments, we are thus led to identify the GYM theory with five interacting scalars as the correct holographic dual.

- [1] G. Festuccia, D. Hansen, J. Hartong, and N. A. Obers, Symmetries and couplings of non-relativistic electrodynamics, *J. High Energy Phys.* **11** (2016) 037.
- [2] A. Fontanella and J. M. Nieto García, Revisiting the symmetries of Galilean electrodynamics, *J. High Energy Phys.* **06** (2025) 058.