Published for SISSA by Springer

Received: *February 16, 2016*
Accepted: *February 16, 2016*
Published: *February 26, 2016*

JHEP02(2016)177

Erratum: On Newton-Cartan trace anomalies

Roberto Auzzi,[a,b] **Stefano Baiguera**[a] **and Giuseppe Nardelli**[a,c]

[a] *Dipartimento di Matematica e Fisica, Università Cattolica del Sacro Cuore, Via Musei 41, 25121 Brescia, Italy*

[b] *INFN Sezione di Perugia, Via A. Pascoli, 06123 Perugia, Italy*

[c] *TIFPA — INFN, c/o Dipartimento di Fisica, Università di Trento, 38123 Povo (TN), Italy*

E-mail: roberto.auzzi@unicatt.it, giuseppe.nardelli@unicatt.it, stefano.baiguera92@gmail.com

Erratum to: JHEP02(2016)003

ArXiv ePrint: 1511.08150

doi:10.1007/JHEP02(2016)177

Due to an overcounting of the number of linearly-independent terms in the basis, the type A anomaly disappears because it can be eliminated by local counterterms $\mathcal{A}_{\rm ct}$. The complete anomaly then is:

$$2T^0_0 + T^i_i = \mathcal{A} = b\sigma J^2 + \mathcal{A}_{\rm ct}\,. \tag{1}$$

This is in agreement with [1].

The basis of the anomaly in eq. (3.18) turns out to be redundant, due to the presence of the following relations (which are valid if the Frobenius condition $n \wedge dn = 0$ holds):

$$\begin{aligned} W^2 &= 12J^2\,, \\ E_4 &= 72\chi^2 - 4\chi R - 48\chi\Omega + 8\Omega^2 - 8\Omega_{AB}\Omega^{AB}\,, \\ (R_{AB} + 2\Omega_{AB})w^A w^B &= 8\chi(R - 6\chi + 4\Omega)\,, \\ (R_{AB} + 2\Omega_{AB})\Omega^{AB} &= 12\chi^2 + \frac{1}{2}\Omega(R + 4\Omega) - \chi(R + 9\Omega)\,. \end{aligned} \tag{2}$$

Consequently, the elements A_1, A_2, A_{11} and A_{13} can be written as linear combinations of the remaining terms. The basis of commutators of two Weyl variations in eq. (3.23) is also redundant:

$$C_8 = 8C_2 - 4C_3 + \frac{1}{2}C_4 - 5C_5 + 2C_6\,. \tag{3}$$

Then, the matrix in eq. (3.24) becomes

$$(M^t)^{mk} = \begin{pmatrix} 0 & 12 & 0 & 0 & 0 & 0 & -1 & 0 & 0 & -4 & 0 & 0 \\ 0 & 0 & 0 & 0 & -1 & 6 & 0 & 3 & 8 & 0 & 2 & 4 \\ 0 & 0 & 0 & -2 & 0 & 0 & 6 & -2 & 0 & 0 & -2 & -4 \\ 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} & -1 & \frac{1}{4} & 0 & -2 & 0 & 0 \\ 0 & 0 & -1 & 0 & -1 & 0 & 0 & -3 & -16 & 0 & 0 & 0 \\ 0 & 0 & 0 & -2 & -\frac{1}{2} & 0 & 0 & 1 & 4 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -6 & -\frac{1}{2} & -1 \end{pmatrix}. \tag{4}$$

The null space of this matrix (which has dimension 6) can be written as direct sum of the 5 counterterms:

$$\begin{aligned} &\sigma D^2 R\,, \qquad \sigma D^2(\Omega - 2\chi)\,, \qquad \sigma\left(12\chi^2 - 4\chi\Omega - \frac{1}{2}\Omega_{AB}w^A w^B\right)\,, \\ &\sigma\left(2R\chi - 2R\Omega + \frac{w^A D_A R}{2} - 6D^2\chi\right)\,, \\ &\sigma\left(-9\chi^2 - \Omega^2 + 6\chi\Omega + \Omega^2_{AB} + \frac{\chi R}{2}\right)\,, \end{aligned} \tag{5}$$

and the remaining type B anomaly J^2.

Acknowledgments

We are grateful to Shira Chapman and Igal Arav for useful discussions.

References

[1] I. Arav, S. Chapman and Y. Oz, *Non-relativistic scale anomalies*, arXiv:1601.06795 [INSPIRE].

JHEP02(2016)177