Correction

Correction to: The Chirality Theorem

José M. Gracia-Bondía, Jens Mund and Joseph C. Várilly

Correction to: Ann. Henri Poincaré 19 (2018), 843–874
<https://doi.org/10.1007/s00023-017-0637-3>

After formula (2.7a) of the paper, we omitted to indicate that its right-hand side, as a distribution in p , cannot be restricted to the zero-mass shell. Therefore, for massless particles, the two-point function is not well defined as it stands. On the other hand, the intertwiner function (2.3) is well defined and locally integrable, as stated. Thus, the corresponding string-local fields with light-like strings are hermitian form-valued distributions, rather than operator-valued distributions.

As a consequence, a few expressions in Section 6 are merely formal. Nevertheless, all expressions for second-order tree-graph contributions to the S -matrix elements or to interacting correlation functions are well defined for certain generic configurations of external momenta. Assuming that the Fourier transform of the switching function g has support in a small region Δ around the origin, one can choose $l^\perp + \Delta$ away from all partial sums of the external momenta, thereby avoiding the singularities.

Furthermore, this issue does not affect the proofs or the conclusion of the article: in the arguments which determine the full set of couplings of the electroweak bosons to the fermions, that massless A -field appears only in a spectator role in Step 3—by then chirality of the charged bosons interactions has been demonstrated. In Step 4 there is a “crossing” between that field and the Maxwell field: this is entirely legitimate, since the corresponding two-point function is well-defined.

(It should also be noted that, in the massive case, the on-shell functions $M^{\varphi\chi}(p, l)$ should be regularized when they enter into time-ordered two-point

functions (where p is not restricted to the mass shell): each factor (pl) must be replaced by $(pl) + i\varepsilon$ or $(pl) - i\varepsilon$, according as it stems from the χ - or the φ -intertwiner.)

We point out, finally, that there is a factor δ_l missing on the right hand sides of equations (6.4b) and (6.10b).

Acknowledgements

We thank Paweł Duch, Karl-Henning Rehren and Christian Gaß for friendly advice and helpful suggestions.

José M. Gracia-Bondía
Departamento de Física Teórica
Universidad de Zaragoza
50009 Zaragoza
Spain
e-mail: jmgb@unizar.es

Jens Mund
Departamento de Física
Universidade Federal de Juiz de Fora
Juiz de Fora MG 36036-900
Brasil
e-mail: mund@fisica.ufjf.br

Joseph C. Várilly
Escuela de Matemática
Universidad de Costa Rica
San José 11501
Costa Rica
e-mail: joseph.varilly@ucr.ac.cr