Ahn, Changhyun
Higher spin currents with manifest $SO(4)$ symmetry in the large $\mathcal{N} = 4$ holography. (English)
Zbl 1414.81126

In this work, that can be seen as an extension of the paper [C. Ahn and H. Kim, J. High Energy Phys. 2014, No. 12, Paper No. 109, 44 p. (2014; Zbl 1417.81156)] but from a different perspective, the author continues the analysis of higher spin currents in the large $\mathcal{N} = 4$ holography, focusing on the case of $SO(4)$-symmetry. Basing on the standard spin currents of the nonlinear $\mathcal{N} = 4$ superconformal algebra, the 16 higher spin currents with spin $\left(1, \left(\frac{3}{2}\right)^4, (2)^4, \left(\frac{5}{2}\right)^4, 3\right)$ are determined in terms of affine Kac-Moody spin-$\frac{1}{2}$ one currents in the Wolf space coset model using the operator product expansion. The eigenvalue problem for coset representations with at most four boxes is analyzed in detail, deriving the corresponding three-point functions with two scalar operators for finite $(N,k)$. Taking into account the $(N,k)$ ’t Hooft like limit, the eigenvalues associated with any boxes of Young tableaux are computed, from which a description of the three-point functions in terms of the ’t Hooft coupling constant is obtained. The paper enumerates some central open problems such as the existence of nontrivial identities between the various tensors obtained in the operator product expansion, the eigenvalue problem of three-point functions for higher representations as well as the bulk dual theory.

Reviewer: Rutwig Campoamor-Stursberg (Madrid)

MSC:
81R10 Infinite-dimensional groups and algebras motivated by physics, including Virasoro, Kac-Moody, $W$-algebras and other current algebras and their representations
81R25 Spinor and twistor methods applied to problems in quantum theory
81T40 Two-dimensional field theories, conformal field theories, etc. in quantum mechanics
81R05 Finite-dimensional groups and algebras motivated by physics and their representations
22E70 Applications of Lie groups to the sciences; explicit representations
81T20 Quantum field theory on curved space or space-time backgrounds

Keywords: higher spin symmetry; $W$ symmetry; extended conformal symmetry; AdS/CFT

Software: Mathematica

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References:

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