Non-relativistic spin-3 symmetries in 2+1 dimensions from expanded/extended Nappi-Witten algebras

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Abstract

We show that infinite families of non-relativistic spin-3 symmetries in $2 + 1$ dimensions, which include higher-spin extensions of the Bargmann, Newton-Hooke, non-relativistic Maxwell, and non-relativistic AdS-Lorentz algebras, can be obtained as Lie algebra expansions of two different spin-3 extensions of the Nappi-Witten symmetry. These higher-spin Nappi-Witten algebras, in turn, are obtained by means of Inönü-Wigner contractions applied to suitable direct product extensions of $sl(3, R)$. Conversely, we show that the same result can be obtained by considering contractions of expanded $sl(3, R)$ algebras. The method can be used to define non-relativistic higher-spin Chern-Simon gravity theories in $2 + 1$ dimensions in a systematic way.

Referencias

[1] Caroca, Ricardo, Diego M. Peñafiel, and Patricio Salgado-Rebolledo. "Non-relativistic spin-$3 $ symmetries in $2+ 1$ dimensions from expanded/extended Nappi-Witten algebras." *arXiv preprint arXiv:2208.00602* (2022).