Supertransformation of massless higher-spin gauge supermultiplet in nonlinear supersymmetric general relativityityyNLSGRT

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% \documentstyle[12pt]{article} \setlength{\textwidth}{15cm} \setlength{\textheight}{22cm} \addtolength{\oddsidemargin}{-9mm} \addtolength{\topmargin}{-10mm} \setlength{\parskip}{2mm} % % \renewcommand{\thefootnote}{\fnsymbol{footnote}} \newlength{\extraspace} \setlength{\extraspace}{3mm} \newlength{\extraspaces} \setlength{\extraspaces}{3mm} $\label{legin} where the set of the set of$ $\label{laboredisplayshortskip} \extraspace \addtolength \below displayshortskip \extraspace \extrasp$ % \newcommand{\ba}{\begin{eqnarray} \addtolength{\abovedisplayskip}{\extraspaces} \addtolength{\belowdisplayskip}{\extraspaces} $\label{length} with the length above displays horts with the length add to length the length the$ \begin{document} \thispagestyle{empty} \setlength{\baselineskip}{6mm} % % % Considering (unstable) Riemann space-time whose tangent space possesses % NLSUSY structure specified by the Grassmann coordinates ψ_{α} for SL(2,C) and the ordinary Minkowski coord dinates x^a for SO(1,3). we can construct the unified vierbein $w^a{}_{\mu}$ which enables the the ordinary geometric argument of the general relativity(GR) principle %on such (unstable) Riemann space-time% and obtain straightforwardly a new Einstein-Hilbert(EH)-type NLSUSY-invariant action $\mathcal{K}(L_{NLSGR} = |w|(R(w) + \Lambda)$ (Nonlinear-supersymmetric general relativity theory(NLSGR)) equipped with the cosmological term and the promising gauge symmetries. %. ith the cosmological term. % Due to the NLSUSY structure of space-time L_{NLSGR} would breaks down % (called {\it Big Collapse}) spontaneously to ordinary EH action of graviton, % NLSUSY action of Nambu-Goldstone(NG) fermion $\psi^i, i = 1.2, ..., N$ % (called {it superon}) and their gravitational interaction called {it superon-graviton action} $L_{SGM}(e, \psi)$. $\mathbb{N} \times \mathbb{N}$ \mathbb{N} Simultaneously the universal attractive force graviton would dictates the evolution (vacuum) of L_{SGM} by producing the all possible gravitational composites of superons which corresponds to the (massless) eigenstates of the linear SUSY(LSUSY) SO(N) super-Poincare(sP) algebra of space-time symmetry, which can be regarded as the ignition of the Big Bang (model) of the universe and gives a new paradigm for the supersymmetric unification of space-time and matter. %To elucidate the transition(trancation) from NLSUSY(NLSGR) to LSUSY(SUGRA) % By the systematic linearization of NLSUSY we show in the toy model that the standard model(SM) of the low energy particle physics can emerge in the (flat space) true vacuum of L_{NLSGR} , where all particles are the (massless) superon-composite eigenstates of LSUSY superalgebra. \\ % %By the speculative arguments we show that NLSGR/ SGM paradigm can bridge naturally the cosmology and the low energy particle physics, which provides new insights into unsolved problems of cosmology, SM and mysterious relations between them, e.g. the space-time dimension four, the origin of SUSY breaking, the dark energy and the dark matter, the dark energy density $\approx (neutrino mass)^4$, the tiny neutrino mass, the three-generations structure of quarks and leptons, the rapid expansion of space-time, the magnitude of the bare gauge coupling constant, the picture of black hole etc. \\ Towards the direct linearization of N=10 NLSGR the supertransformation of higher-spin massless gauge supermultiplet is discussed. \\ All results are published separately in letters. For more details: K. Shima, Invited talk at Conference on Cosmology, Gravitational Waves and Particles ,2017, NTU, Singapore (Uploaded at YouTube by IAS). Proceedings of CCGWP, ed. Harald Fritzsch, (World Scientific, Singapore, 2017), 301. \\K. Shima, Preliminary temporal report: arXiv:2012.01646hep-th \end{document}

Presenter: SHIMA, Kazunari (Saitama Institute of Technology)

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