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A role of SUSY before/around Planck

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Considering NLSUSY-structure of space-time just inspired by nonlinear representation of SUSY(NLSUSY) and performing the ordinary geometric arguments of Einstein general relativity(GR) principle, we obtain NLSUSY invariant Einstein-Hilbert-type general relativity action(nonlinear supersymmetric general relativity (NLSUSYGR)) equipped with the cosmological term of the robust SUSY breaking encoded in space-time itself. NLSUSYGR would collapse spontaneously(Big Collapse) to ordinary Riemann space-time(Einstein gravity) and Nambu-Goldstone fermion(matter) for [superGL(4,R)/GL(4,R)]. We show in the simple model that SM and probably SUGRA as well can emerge in the true vacuum of NLSUSYGR as the effective theory composed of NG fermion, which bridge naturally the cosmology and the low energy particle physics and gives new insights into unsolved problems of cosmology and SM, which may explain naturally mysterious relations among them, e.g. the space-time dimension four, the dark energy density⊠(neutrino mass)4 , the three-generations structure of quarks and leptons, the magnitude of the gauge coupling constant, etc. [Ref.] K. Shima, Plenary talk(lecture) at Conference on Cosmology, Gravitational Waves and Particles}, 6-10, January, 2017, NTU, Singapore.. Proceeding of CCGWP, ed. Harald Fritzsch, (World Scientific, Singapore, 2017), 301.

Presenter: Prof. SHIMA, Kazunari (Saitama Institute of Technology)

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