Special online session of ICPPA2024
Towards fundamental basis of BSM physics and cosmology

Saturday 26 October 2024, 10.00-13.00 Moscow time

Chairperson M.Yu.Khlopov (VIA, Paris, France; NRNU MEPHI Moscow and SFEDU, Rostov-on-Don, Russia)

The Session will take place on the platform of Virtual Institute of Astroparticle physics in zoom

https://cern.zoom.us/j/4420940189?Pwd=LzVjQlYra0NQVVFqb3d6czRKYW1Ydz09
Meeting ID 442 094 0189
pass code (if required) 628661

The Programme

A new understanding of elementary fermion and boson fields offers new understanding of cosmological history

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The new proposal presenting the internal spaces of all fermion and boson second quantized fields (of quarks and leptons and antiquark and antileptons, photons, weak bosons, gluons and gravitons) in a unique way, will be presented. The theory explains the properties of all fermion and boson fields that the Standard model assumes; predicts existence of right handed neutrinos and left handed antineutrinos and another weak field; requires the existence of families

of quarks and leptons and the existence of the dark matter; announces the exis-tence of a fourth family to the observed three; explains the second quantization postulates of Dirac; explains the existence of the scalar fields as the Higgs bo-son; predicts new scalar fields that gave rise to inflation of the universe after Big Bang, offers an explanation for many a cosmological observation.

For an arbitrarily chosen symmetry of internal spaces, it is the number of fermion fields appearing in families equal to the number of boson fields, mani-festing a kind of supersymmetry that is different from supersymmetry as offered by strings theory, which promises to explain everything but demands duplication of known fermion and bosons with as-yet undiscovered ones.

On the assumption that fermions and bosons are active (they have momenta different from zero) only in $d = (3 + 1)$ ordinary space-time, bosons present vectors if they carry the space index $\mu = (0, 1, 2, 3)$, and present scalars if they carry the space index $\sigma \geq 5$.

The author discusses the relationship between this model, named *spin-charge-family* theory, manifesting in a long series of papers, the phenomeno-logical success of the theory and the string theory.

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An algebra of internal states in closed (super)strings

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We interpret the well know fact that the internal states of closed strings is given as across product of a right moving part and a left moving part as giving rise to an algebra structure on this space of internal states. It is actually rather easy to see that from such a cartesian product structure an algebra can be defined.

The important point we want to express here is that in the spin-charge theory of Norma Mankoč Borštnik a similar algebra for internal states of the particles is postulated. However, there are severe differences between these two proposals even though the algebra for an internal state space is in the abstract sense the same. Even the similarity with Clifford algebra in the sense of having a dimensionality of the algebra being a power of the number 2 turns out for both cases.

Norma Mankoč has long worked that the inner space of actually both fermions and bosons should be organized as an algebra, which is actually taken as a Clifford algebra.

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Questions and answers. Discussion

Questions to be discussed:

Do strings and the proposal of Norma Manko˘c have anything in common?

Can the proposal of Norma Manko˘c be extended meaningfully with extension of the coordinate to strings?

Requests for participation in discussion and brief presentations should be sent to

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