Hypersphere space-time model

(draft)

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Abstract

The origin of the three spatial dimensions as well as that of time is deduced from fundamental principles (symmetry). The structure resulting from this construction looks like an hypersphere of which each energy particle constitutes a dimension, forming a loop or a string covering the whole universe. This model shall be linked to the existing theories that are in adequation with the experience.

Generation of space

Nothing (*symmetry*) generating something (*energy*) can be expressed by the addition and the multiplication of an energy quantum (a) and its opposite ($\bar{a}$) :

$a + \bar{a} = 0$ (*symmetry*), $a\bar{a} = 1$ (*energy*) → $a = i$ and $\bar{a} = -i$ where $i^2 = -1$.

The quantum (a) is a complex number ($a = a_1+ia_2 \in \mathbb{C}$, $a_1, a_2 \in \mathbb{R}$, $i^2 = -1$) so it behaves like a wave, more precisely like the π/2 phase of a virtual (potential) standing wave. It's the same for the opposite ($\bar{a}$).

The quantum (a) and its opposite ($\bar{a}$) form a pair of complex numbers ($a,\bar{a}$). Energy conservation implies that the multiplication of two pairs of quanta shall not be null.

- TODO :
  - vérifier équation de Dirac bi-quaternion,
  - comprendre pourquoi le moment cinétique est conservé (d/dx=0) lors d'interaction
- pourquoi quaternion $\mathbb{Q}$ à partir de $\mathbb{C}$ -> conservation produit (seule algèbre possible), lien (état produit) entre les deux $\mathbb{C}$ (chiralité)
- le produit bra-ket est la base -> division, orthogonalité, propagation (ex : matrice évolution A -> $U^{-1}AU$)-> non associatif, indiscernabilité
- propagation par auto application (Minkowski)
- masse existe car bi-quaternion pas d'inverse, masse fondamentalement négative ou complexe possible -> i^4 pour devenir 1, chapeau mexicain
- brisure de symétrie -> probabilités asymétriques (pas 1/2), masses constantes
- entropie car interaction conservée (stationnaire), nombre fini ou non de $\mathbb{Q}$
- définir champs, union de champs, interaction (projection), constante de structure (./. vitesses)
- se baser sur c et h constants
- NB :
  - U3 diagonale i
  - imprécision/indétermination augmente avec le temps
  - exclusion de Pauli agrandit univers
  - projecteur $E^2=E$ -> E=0 ou 1
  - double converture SO3 par SU2 -> spin

Conclusion

Based on the hope that Nature is simple, this article introduces a new representation of space-time structure of the universe : an hypersphere structure on a multi-dimensional space, each dimension is an energy quantum with its opposite forming a quaternion covering the whole universe. The implications of this hypothesis are vast and go far beyond this short article.

There is still a long way to envolve the whole physic in one theory but this bottom-up approach, from simple principles to more complex structures, in adequation with the observed reality, is probably a good way to elaborate a simple and comprehensive theory. This intuitive approach tries to answer to a fundamental question : why has the universe an apparent 3 dimensional structure in addition of time, which is far from an evidence ?

Whether the theory is correct or not, it seems increasingly clear that the space-time is not a fundamental structure, it's the consequence of the interaction between particles. That's why calculations based on space-time can become unstable.To explain the universe, the ether is not necessary, perhaps neither is space-time.