Quanta of Decay Momentum

Ilgaitis Prūsis[1,] Peteris Prūsis[2]

Abstract

The article discloses a new property of any known forcefield: elementary particles have an equal initial momentum at the distances comparable with the radius of a proton. It is probably the quanta of a decay momentum.

Keywords: elementary particle, force field, quanta, momentum, decay, property, interaction, life time, universe
PACS Classification codes:
13.30.-a. Decays of baryons; 01.55.+b General physics; 12.10.-g Unified field theories and models;
01.70.+w Philosophy of science.

Introduction

Particle physics shows that the strength of force is associated with the time to decay. The typical time to decay and the relative strength of forces at a distance of 10^{-13} cm are given in Table 1.

Table 1

Strength of force and time to decay [1].

Type of force	Gravitation	Weak	Electromagnetic	Nuclear
Strength relative to nuclear	10^{-38}	10^{-13}	10^{-2}	1
Time to decay, s	-	10^{-10}	10^{-20}	10^{-23}
Product of time and strength	-	10^{-23}	10^{-22}	10^{-23}

The product of time to decay and relative strength of force is the same for nuclear and weak forces.

[1] Independent researcher;
[2] Independent researcher

Momentum of particle decay

According to Newton law the force is:

$$F = ma = mv/t ,$$

where: m – mass,
a – acceleration,
v – velocity,
t – time.

Therefore: Ft = mv. It is a momentum. The decay momentum of particles for nuclear and weak decay is the same for the distance of 10^{-15}m.

Recalculating Table 1 for the distance of $2*10^{-16}$m between two nucleons one gets the same momentum for nuclear, weak and electromagnetic forces. For recalculating the strength of forces the theory disclosed in [2] is used. The results are displayed in Table 2.

Table 2

The momentum of particle decay

Type of force	Gravitation	Weak	Electromagnetic	Nuclear
Force, N	$2*10^{-32}$	$2*10^{-6}$	$2*10^{4}$	$2*10^{7}$
Time to decay, s	-	10^{-10}	10^{-20}	10^{-23}
Momentum, Ns	-	$2*10^{-16}$	$2*10^{-16}$	$2*10^{-16}$

The decay of particles in the gravitation mode has not been observed yet. Therefore the time to decay is unknown. Presuming that the decay momentum is the same for all four forces one can calculate the time to decay (live time) for gravitation: t = $2*10^{-16}$Ns / $2*10^{-32}$N = $\mathbf{10^{16}}$**s**. It is about $3*10^{8}$ years. This explains why the decay of particles in the gravitation mode is not observed.

Conclusions

1. The unification of all known forces is possible on the basis of momentum.
2. The quanta of decay momentum is common for all interactions.

3. The long live time (300 million years) of gravitation interactions explains formation processes of galaxies, planetary systems, etc.

4. The actual value of the quanta of decay momentum should be specified by detailed researches of particle decay properties.

References

1. http://nap.edu/629 Elementary-Particle Physics.

2. https://ia601508.us.archive.org/17/items/SpaceEquation-BasicEquationOfUnifiedFieldTheory/Space%20Equation%20%E2%80%93%20Basic%20Equation%20of%20Unified%20Field%20Theory.pdf

Acknowledgements: We are very grateful to Ieva Mazere and Valda Kalniņa for valuable discussions and assistance.

Correspondence and requests for materials should be addressed to I.P. (ilgaitis@gmail.com).