ON THE MASS SPECTRUM OF ELEMENTARY PARTICLES IN UNITARY QUANTUM THEORY

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(Received 8 November 2007; accepted 8 January 2008)

Abstract

The particle is represented by the wave packet in nonlinear space-time continuum. Because of dispersion, the packet periodically appears and disappears in movement and the envelope of the process coincides with the wave function. There was considered the partial differential equation of telegraph-type describing the motion of such wave packet in spherical coordinate space \((r, \theta, \varphi)\). There was constructed also the analytical solution \(u(r, \theta, \varphi)\) of this equation and the integral of \(|\text{grad}|u|^2|^2\) over all space was supposed being equal to the
mass of the particle identified with the wave packet. The solution $u(r, \theta, \varphi)$ depends on two positive integer parameters $L, m$ and our theoretical particle's masses for different $L, m$ were calculated. So, we have obtained the theoretical mass spectrum of elementary particles. The comparison with known experimental mass spectrum shows our calculated theoretical mass spectrum is sufficiently verisimilar.