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The Model of Complex Structure of Quark RONGWU LIU, None —

In Quantum Chromodynamics, quark is known as a kind of point-like fundamental particle which carries mass, charge, color, and flavor, strong interaction takes place between quarks by means of exchanging intermediate particles—gluons. An important consequence of this theory is that, strong interaction is a kind of short-range force, and it has the features of “asymptotic freedom” and “quark confinement”. In order to reveal the nature of strong interaction, the “bag” model of vacuum and the “string” model of string theory were proposed in the context of quantum mechanics, but neither of them can provide a clear interaction mechanism. This article formulates a new mechanism by proposing a model of complex structure of quark, it can be outlined as follows: (1) Quark (as well as electron, etc) is a kind of complex structure, it is composed of fundamental particle (fundamental matter mass and electricity) and fundamental volume field (fundamental matter flavor and color) which exists in the form of limited volume; fundamental particle lies in the center of fundamental volume field, forms the “nucleus” of quark. (2) As static electric force, the color field force between quarks has classical form, it is proportional to the square of the color quantity carried by each color field, and inversely proportional to the area of cross section of overlapping color fields which is along force direction, it has the properties of overlap, saturation, non-central, and constant. (3) Any volume field undergoes deformation when interacting with other volume field, the deformation force follows Hooke’s law. (4) The phenomena of “asymptotic freedom” and “quark confinement” are the result of color field force and deformation force.

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