

T 24: Andere Gebiete der Theorie

Zeit: Freitag 9:45–10:30

Raum: VG 3.101

T 24.1 Fr 9:45 VG 3.101

Conformal Unification - a new path to a Higgs free standard model — ●KARSTEN BUSSE — Martin-Luther-Universität Halle Wittenberg, von-Danckelmann-Platz 4, 06120 Halle

A conformal invariant generalization of the Dirac equation for massive spinors is constructed, which can be used to predict an additional relationship between the three coupling constants in the low energy limit: the SU(2) gauge coupling constant g_2 must equal the geometric average of the U(1) and SU(3) coupling constants. At MZ the deviation is only 2% for PDG values. Furthermore, the corresponding SU(2) coupling is parity violating and the SU(3) coupling obtains asymptotic freedom. The Lagrangian is simplified by using two different approaches: in case of pointlike particles, the mass term remains in the equations, whereas in case of extended fields (QFT approach) the mass term vanishes. In both cases, left and right handed components of the spinor are mixed by local conformal transformations.

T 24.2 Fr 10:00 VG 3.101

The Origin of Mass - without Higgs — ●ALBRECHT GIESE — Taxusweg 15, 22605 Hamburg

Present-day particle physics is characterized by elements of circular logic. From specific interpretations of experiments it was concluded that elementary particles are point-like in size. This made it impossible to understand physical properties such as their magnetic moment classically. The latter was taken as proof that elementary physics can only be conducted using quantum mechanics (QM). In order to treat such cases, QM invented virtual particles that surround a particle. At present, the most prominent virtual particle is the Higgs boson.

If we do not adopt every aspect of QM in principle, there are promising ways of reaching better solutions. By assuming that elementary particles are not point-like but extended, it follows that:

Phenomena such as magnetic moment and spin can be explained classically with quantitatively correct results. And the inertial mass of a particle follows straightforwardly for an extended structure from the finiteness of the speed of light - with high precision. The Higgs is no longer required as virtual particles are dispensable, even more so for explaining mass.

In addition, such a model explains relativity without any reference to Einstein's ideas about space-time.

Further information: www.ag-physics.org/rmass

T 24.3 Fr 10:15 VG 3.101

The fine structure constant alpha and the Rydberg energy: keys to all particle masses? — ●KARL OTTO GREULICH — Fritz Lipmann Institut Beutenbergstr 11 07745 Jena

Recently it has been noticed that all particle masses, with accuracy of often better than 1 per cent, are integer (hadrons except nucleon) or half integer (leptons and nucleon) multiples of the $1/\alpha$ (fine structure constant) fold electron mass. The influence of alpha goes even deeper: the electron mass $511 \text{ keV}/c^2$ turns out to be the $2/\alpha^2$ fold Rydberg Energy (13.6 eV) with an accuracy of 370 ppm, i.e essentially exact. The rest energy of the electron is the lowest energy solution of the Schrödinger equation for the hydrogen atom, when the charge of the electron is replaced by the Planck charge, $e/\sqrt{\alpha}$. References: K. O. Greulich J Mod Phys 1, 300 - 302 (2010); K.O. Greulich SPIE Proceedings 8121-15, (2011); for downloads see http://www.fli-leibniz.de/www_kog/ then klick *Physics*