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Generalisation of the Yang-Mills Theory and Physics Beyond the Standard Model

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We suggest an extension of the gauge principle which includes new tensor gauge bosons. In this extension of the Yang-Mills theory the vector bosons of SM become the members of the bigger family of gauge bosons of larger spins. The proposed extension is essentially based on the extension of the Poincar´e algebra. We calculated the scattering amplitudes of tensor bosons at tree level, as well as their one-loop contribution into the Callan-Symanzik beta function. This contribution is negative and corresponds to the asymptotically free theory. The proposed extension leads to a natural inclusion of the Standard theory of fundamental forces into theory in which vector bosons, leptons and quarks represent a low-spin subgroup. We consider a possibility that inside the proton and, more generally, inside hadrons there are additional partons - tensorgluons, which can carry a part of the proton momentum. The parton distribution functions (PDF) of the tensorgluons is calculated. The extension of QCD influences the unification scale at which the coupling constants of the Standard Model merge, shifting its value to lower energies.

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