The Higgs mass derived from the U(3) Lie group

The Higgs mass value is derived from a Hamiltonian on the Lie group U(3) where we relate strong and electroweak energy scales. The baryon states of nucleon and delta resonances originate in specific Bloch wave degrees of freedom coupled to a Higgs mechanism which also gives rise to the usual gauge boson masses. The derived Higgs mass is around 125 GeV. From the same Hamiltonian, we derive the relative neutron to proton mass ratio and the N and Delta mass spectra. All compare rather well with the experimental values. We predict scarce neutral flavor baryon singlets that should be visible in scattering cross-sections for negative pions on protons, in photoproduction on neutrons, in neutron diffraction dissociation experiments and in invariant mass spectra of protons and negative pions in B-decays. The fundamental predictions are based on just one length scale and the fine structure constant. More particular predictions rely also on the weak mixing angle and the up-down quark flavor mixing matrix element. With differential forms on the measure-scaled wave function, we could generate approximate parton distribution functions for the u and d valence quarks of the proton that compare well with established experimental analysis.

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