The purpose of this three-part chapter is to develop a more detailed view of the relationship between electroweak and strong interactions at the level of the embedding space H. In the first part of the chapter the general vision is described. In the second part a concrete model for the Weinberg angle is developed, leading to a vision about the relationship of weak and strong interactions in the TGD framework. In the third part the masses of W and Z^0 and their ratio are estimated, and questions related to the relationship of weak and strong interactions are discussed.

General view. Quantum TGD involves three levels corresponding to embedding space $H = M^4 \times CP_2$, space-time X^4 and "world of classical worlds" (WCW). Holography principle at X^4 level implies the absence of path integral and related divergence problems. Holography = holomorphy (H-H) principle allows an exact solution of field equations. Also Lagrangian minimal surfaces are allowed as candidates for preferred extremals.

Bosons are not primary fields and correspond at H and WCW levels to bound states of fermions. At H and X^4 level bosons correspond to induced spinor connections and apparently only electroweak gauge bosons are present. These couplings however involve implicitly vector boson couplings identified as $U(1)$ counterparts of gluons by electric-magnetic duality. The challenge is to identify the gluon propagators at the level of X^4.

Fermions at the H level are identified as modes of H spinor fields forming a hierarchy of color multiplets. This predicts a hierarchy of standard model physics. At the X^4 level fermions correspond to induced spinor fields.

Construction of scattering amplitudes. Interactions are contact interactions with contacts defined by the 2-D string world sheets as intersections of space-time surfaces, including self intersections. Fermion lines correspond to intersections of string world sheets and partonic orbits.

Zero energy ontology (ZEO) and the associated mild classical non-determinism are fundamental. The loci of classical non-determinism as intersections of 3-D edges of space-time with 3-D partonic orbits define partonic 2-surfaces as geometric vertices. Feynman graphs are replaced with analogs of Brownian motion for 3-surfaces and associated fermion lines. Fermion propagators are free propagators in H. Bosonic propagators correspond to WCW correlation functions.

QCD serves as a role model. The notions of fragmentation and hadronization are generalized. H level corresponds to observed hadrons and leptons. At X^4 level quark gluon plasma is replaced by induced spinor fields for quarks and leptons. ZEO gives rise to statistical aspects appearing also in QCD.

Standard model and TGD. The Higgs mechanism is a key element of the standard model. p-Adic thermodynamics replaces it at the level of WCW. At the X^4 level massivation is described in terms of warping distinguishing between GRT and TGD.

Kähler-Chern-Simons action (KCS) and corresponding modified Dirac action define the dynamics for the partonic orbits. M^4 possesses an analog of Kähler structure and contributes to this action an additive part.

Color confinement involves two steps. First color triplets/singlets are formed from quark/leptonic color multiplets and then color triplets form hadrons. The color information is coded by WCW wave functions for the position of the fermion line and its edge at the partonic 2-surface. The 3 members of the color triplet are associated with the 3 coordinate patches of CP_2.

The condition stating that the emission amplitude for conformal photons vanishes is postulated and states conformal invariance. Electric-magnetic duality states that $U(1)$ interaction at X^4 level corresponds to color interaction of QCD such that the two coupling strengths are inverses of each other. A model for WCW wave functions as monopole harmonics at partonic 2-surfaces leads to a 3-D generalization of Weinberg rotation and an estimate of the Weinberg angle, identification of strong and weak interactions as parts of color interaction and estimate of the strong coupling strength.