This chapter discusses some recent unexpected finds related to hadron- and nuclear physics.

\begin{enumerate}

\item The recent experiments of Dove et al confirm that the antiquark sea is asymmmetric in the sense that the ratio anti-d/anti-u is larger than unity. A model assuming that proton is part of time in a state consisting of neutron and virtual pion seems to fit at qualitative level into the picture.

The TGD based model relies on the already existing picture developed by taking seriously the so called X boson as 17.5 MeV particle and the empirical evidence for scaled down variants of pion predicted by TGD. Virtual mesons are replaced with real on mass shell mesons but with p-adically scaled down mass, and low energy strong interactions at the hadronic and nuclear level are described topologically in terms of reconnections of flux tubes.

\item That final state nuclei from the fission of heavy nuclei possess a rather high spin has been known since the discovery of nuclear fission 80 years ago but has remained poorly understood. The recent surprising findings by Wilson et al was that the final state angular momenta for the final state nuclei are uncorrelated and must therefore emerge after the decays.

The TGD proposal is that the generation of angular momentum is a kind of self-organization process. Zero energy ontology (ZEO) and h_{eff} hierarchy indeed predicts self-organization in all scales. Self-organization involves energy feed needed to increase $h_{eff}/h_0= n$ serving as a measure for algebraic complexity and as a kind of universal IQ in the number theoretical vision about cognition based on adelic physics.

The final state nuclei have angular momenta $6-7$ $\hbar$. This suggests that self-organization increases the values of h_{eff} to nh, $n\in \{6,7\}$. Quantization of angular momentum with new unit of spin would force the generation of large spins. Zero energy ontology (ZEO) provides a new element to the description of self-organization and a model for quantum tunnelling phenomenon.

\item Quite recently, empirical support for a particle christened Odderon has emerged. As the name tells, Odderon is not well-understood in QCD framework.

Odderon is a cousin of Pomeron which emerged already about half century ago in the so called Regge theory to explain the logarithmically rising (rather than decreasing) cross sections in proton-proton and proton-antiproton collisions. Pomeron is part of low energy phenomenology and perturbative QCD cannot say much about it.

\item Eric Reiner has studied the behavior of gamma-rays emitted by heavy nuclei going through a beam splitter splitting the photon beam to two beams. Quantum theory predicts that only one detector fires. Therefore the pulses in the two detectors occur at different times. This has been verified for photons of visible light. The experiment studied the same situation for gamma-rays and the surprise was that one observes mostly half pulses in both detectors and in some cases also full pulses. Reiner has made analogous experiments also with alpha particles with the same conclusion. These findings pose a challenge for TGD, and in this chapter a TGD based model for the findings is developed.

\end{enumerate}

These findings pose a challenge for TGD, and in this chapter a TGD based model for the findings is developed.