This chapter is collected from the material related to the relationship between TGD and hydrodynamics one one hand and TGD and thermodynamics on the one hand. What I have called hydrodynamics ansatz is a proposal for what the preferred extremals of K\"ahler action might be. The basic vision behind the ansatz is the reduction of quantum TGD to almost topological QFT. The basic condition is the vanishing of the contraction of the conserved K\"ahler current j with the induced K\"ahler gauge potential A implying the reduction of the K\"ahler action to 3-D contributions coming from the boundaries between space-time regions of Minkowskian and Euclidian signature.

Hydrodynamical interpretation demands that the flow parameters associated with the flow lines of isometry currents and K\"ahler current extend to global coordinates. Otherwise the flow line would resemble those for a gas of particles moving randomly. This leads to integrability conditions implying generalized Beltrami flow and K\"ahler action for the preferred extremals reduces to Chern-Simons action when the weak electro-weak duality is applied as boundary conditions. This allows also a definition of non-constant quantal order parameters depending on the spatial coordinates transversal to the flow lines.

Kiehn and others have studied Beltrami flows as integrable flows for which the flow lines define coordinate lines. In D=3 this requires that the rotor of the flow vector is parallel to the flow vector stating that Lorentz force vanishes. In D=4 the condition states that Lorentz 4-force vanishes so that also dissipation is absent. This kind of extremals are of special interest as asymptotic self-organization patterns: in fact all preferred extremals might satisfy these conditions. 3-D Beltrami flows are highly interesting topologically since the flow lines can get knotted. Their 4-D counterparts would have flow lines replaced with world sheets which can develop 2-knots. String world sheets carrying induced spinor fields are fundamental objects in TGD framework and they could indeed get knotted.

Kiehn has worked with both Betrami flows developed what he calls topological

thermodynamics (TTD). This work is rather interesting from TGD point of view and the relationship between TTD and TGD is discussed in this chapter.