%\begin{abstract}

The chapter is one of the earliest attempts to apply TGD to macroscopic
physics and must be taken as such. The chapter begins with a brief summary
of the basic notions related to many-sheeted space-time. A generalization
of hydrodynamics to a p-adic hierarchy of hydrodynamics is considered and a
mechanism of energy transfer between condensate levels is identified. It is
suggested that TGD based generalization of Hawking-Bekenstein law holds
even in macroscopic length scales and that hydrodynamical vortices behave
in some aspects like elementary particles. TGD leads to a formulation of a
general theory of phase transitions: the new element is the presence of
several condensate levels.

It has much later become clear that the vision about elementary particles
Euclidian space-time regions defining lines of generalized Feynman diagrams
generalizes to macroscopic scales and that every macroscopic body should
accompany such space-time sheet and thus in some aspects behave like
elementary particle.

A topological model for the generation of the hydrodynamical turbulence is
proposed. The basic idea is that hydrodynamical turbulence can be regarded
as a spontaneous K\"ahler magnetization leading to the increase the value
of K\"ahler function and therefore of the probability of the configuration.
K\"ahler magnetization is achieved through the formation of a vortex
cascade via the decay of the mother vortex by the emission of smaller
daughter vortices. Vortices with various values of the fractal quantum
number and with sizes related by a discrete scaling transformation appear
in the cascade. The decay of the vortices takes place via the so called
phase slippage process.

An encouraging result is the prediction for the size distribution of

the
vortices: the prediction is practically identical with that obtained
from
the model of Heisenberg but on rather different physical grounds.
The model
is rather insensitive to the p-adic scaling of vortices in the
transition
as long as it is smaller than $\lambda= 2^{-5}$. The model is also
consistent with the assumption that the decay of a vortex to smaller
vortices corresponds to a phase transition from a given level of
dark
matter hierarchy to a lower level so that   the value of $\hbar$ is
reduced by a factor $\lambda= v_0/n\simeq 2^{-11}/n$, $n=1,2,...$ so
that
Compton length scales as well as sizes of vortices are reduced by
this
factor.

%\end{abstract}