

The TGD based cosmology predicts that the cosmic expansion occurs as rapid phase transitions, increasing the thickness of the monopole flux tubes and liberating energy.

One application is the Expanding Earth (EE) hypothesis stating that the Cambrian Explosion about half billion years ago was induced by a relatively rapid increase of Earth radius by factor 2: I call this event EE event . The details of the energetics of this transition remain far from well-understood. The same problem appears in the model for the formation of the Moon as a transition in which a surface layer of the Earth was thrown out to form the Moon by gravitational condensation. Where did the energy needed to compensate for the decrease of the gravitational binding energy in these explosive transitions come from? The proposal is that the TGD variant of "cold fusion" provided the energy so that nuclear physics would have played a key role in the geological evolution.

Zero energy ontology (ZEO) suggests that the two events correspond to subsequent "big" state function reductions (BSFRs) in astrophysical scales changing the arrow of geometric time on a scale of billions of years.

The earlier versions of the model made some unnecessarily strong assumptions, in particular the analogy with the recent Mars. A more precise formulation of the analogy allows to get rid of wrong predictions such as absence of oceans, plate tectonics, and continents before the EE event. During recent years it has become clear that superionic phases are possible in the mantle and core and their possible role is discussed from the TGD point of view.