Integrated Information Theory (IIT) is a theory of consciousness originally proposed by Giulio Tononi. The basic goal of IIT is to abstract from neuroscience axioms about consciousness hoped to provide constraints on physical models. IIT relies strongly on information theory. The basic problem is that the very definition of information is not possible without introducing conscious observer so that circularity cannot be avoided. IIT identifies a collection of few basic concepts and axioms such as the notions of mechanism (computer program is one analog for mechanism), information, integration and maximally integrated information (maximal interdependence of parts of the system), and exclusion. Also the composition of mechanisms as kind of engineering principle of consciousness is assumed and leads to the notion of conceptual structure, which should allow to understand not only cognition but entire conscious experience.

A measure for integrated information (called Φ) assignable to any partition of system to two parts is introduced in terms of relative entropies. Consciousness is identified with a maximally integrated decomposition of the system to two parts (Φ is maximum). The existence of this preferred decomposition of the system to two parts besides computer and program running in it distinguishes IIT from the computational approach to consciousness. Personally I am however afraid that bringing in physics could bring in physicalism and reduce consciousness to an epiphenomenon. Qualia are assigned to the links of network. IIT can be criticized for this assignment as also for the fact that it does not say much about free will nor about the notion of time. Also the principle fixing the dynamics of consciousness is missing unless one interprets mechanisms as such.

In this article IIT is compared to the TGD vision relying on physics and on general vision about consciousness strongly guided by the new physics predicted by TGD. At classical level this new physics involves a new view about space-time and fields (in particular the notion of magnetic body central in TGD inspired quantum biology and quantum neuroscience). At quantum level it involves Zero Energy Ontology (ZEO) and the notion of causal diamond (CD) defining 4-D perceptive field of self; p-adic physics as physics of cognition and imagination and the fusion of real and various p-adic physics to adelic physics; strong form of holography (SH) implying that 2-D string world sheets and partonic surfaces serve as \blockquote{space-time genes}; and the hierarchy of Planck constants making possible macroscopic quantum coherence.

Number theoretic entanglement entropy (EE) makes sense as number theoretic variant of Shannon entropy in the p-adic sectors of the adelic Universe. Number theoretic EE can be negative and corresponds in this case to genuine information: one has negentropic entanglement (NE). TGD inspired theory of consciousness reduces to quantum measurement theory in ZEO. Negentropy Maximization Principle (NMP) serves as the variational principle of consciousness and implies that NE can can only increase - this implies evolution. By SH real and p-adic 4-D systems are

algebraic continuations of 2-D systems (\blockquote{space-time genes}) characterized by algebraic extensions of rationals labelling evolutionary levels with increasing algebraic complexity. Real and p-adic sectors have common Hilbert space with coefficients in algebraic extension of rationals so that the state function reduction at this level can be said to induce real and p-adic 4-D reductions as its shadows.

NE in the p-adic sectors stabilizes the entanglement also in real sector (the sum of real (ordinary) and various p-adic negentropies tends to increase) - the randomness of the ordinary state function reduction is tamed by cognition and mind can be said to rule over matter. Quale corresponds in IIT to a link of a network like structure. In TGD quale corresponds to the eigenvalues of observables measured repeatedly as long as corresponding sub-self (mental image, quale) remains conscious.

In ZEO self can be seen as a generalized Zeno effect. What happens in death of a conscious entity (self) can be understood and it accompanies re-incarnation of time reversed self in turn making possible re-incarnation also in the more conventional sense of the word. The death of mental image (sub-self) can be also interpreted as motor action involving signal to geometric past: this in accordance with Libet's findings.

There is much common between IIT and TGD at general structural level but also profound differences. Also TGD predicts restricted pan-psychism. NE is the TGD counterpart for the integrated information. The combinatiorial structure of NE gives rise to quantal complexity. Mechanisms correspond to 4-D self-organization patterns with self-organization interpreted in 4-D sense in ZEO. The decomposition of system to two parts such that this decomposition can give rise to a maximal negentropy gain in state function reduction is also involved but yields two independent selves. Engineering of conscious systems from simpler basic building blocks is predicted. Indeed, TGD predicts infinite self hierarchy with sub-selves identifiable as mental images. Exclusion postulate is not needed in TGD framework. Also network like structures emerge naturally as p-adic systems for which all decompositions are negentropically entangled inducing in turn corresponding real systems.