Review of: "On the statistical arrow of time"

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Potential competing interests: No potential competing interests to declare.

Review report for ‘On the statistical arrow of time’ by A. Henriksson, appeared in Qeios, ttps://doi.org/10.32388/C9JOJ9.

‘When everything is asleep, time is awake, when everything falls, time is erect’. This implies, time is unidirectional, and indeed it is. On the other hand, the number of microstates and the entropy have the common features that both increase for an isolated sytem and tend to maximumm. Although, every observational evidence supports an ever expanding universe model, even if the universe contracts, the process would be irreversible, and the entropy would increase and so would be the time. In the quantum counterpart of ‘General Theory of Relativity’ (Wheeler-deWitt equation), the concept of time ceases to exist, due to ‘diffeomorphic invariance’. This means, it is not viable to ask: ‘what was god doing before he created the universe’? In view of all these, universe being an isolated system, direction of the increase of entropy is the best physical parameter, to relate with the arrow of time. Present author refutes this proposal, in view of his understanding that the concept of entropy is subjective. He states ‘…subjectivity of the concept of entropy, and hence the statistical interpretation of the second law of thermodynamics…’. . He also states that the probability assigned to a system measures the ignorance (uncertainty) of the observer regarding the system, and hence the entropy.

Indeed there is uncertainty in measurements in quantum domain, which is a natural restriction and has nothing to do with observers ignorance. With such restriction, path difference of 10^{-22} cm has been measured accurately in LIGO. Clearly, in the process of criticising the arrow of time, present author essentially critisized the second law of Thermodynamics as well as the whole developments of Statistical mechanics, as well as Qunatum mechanics. He requested the teachers to make student understand that the concept of entropy is subjective, while eveyone knows that is subjectivism does not fall within the realm of science.

There are several wrong assertions such as:

1. In the last line of the first paragraph, author writes ‘…the observer was fairly certain about the locations of the gas molecules, as they were contained in the small box.’ What does the author mean by location? In physics, it is the position and momentum of each and every molecule, which are never known.
2. Throwing a set of cards or tossing dices are presented to understand probability, but these systems (states) being non-evolving, the argument made by the author in connection with statistical mechanics, is not relevant.
3. Point (i) in page 4 has no connection with physics, since observer can never know the microscopic states of each and every micro-particle. Entropy vanishes at absolute zero, which is the Nernst heat theorem.

In a nut-shell, I find authors arguments are false and unphysical.