

## Evaluating entropy and the increasing entropy principle & time dependence.

The principle of increasing entropy Clausius Inequality:  $\oint \frac{\partial Q}{T} \leq 0$  (1)

We introduce Effective Entropy where  $S(r,t)$  is the entropy

$$\frac{R}{r} \Delta S(r, t) = \frac{1}{v^2} \frac{\partial^2 S(r,t)}{\partial t^2} \quad (2)$$

With condition:

A)  $S(0,0)=0$ .

B)  $S(2R,t)=0$ .

C)  $\text{Diff}(S(r,0),r)=R$ ?!

D) Velocity  $V = c$  speed of light in case of a massless particle (of a wave of entropy)

Where  $R$  is a distance constant value of  $3.9228 \cdot 10^{22}$  m approx. 4.1465 million Light Year or 1.2713 million Parsec. Entropy change = Entropy final state – Entropy initial state

$$\Delta S_{\text{system}} = S_{\text{final}} - S_{\text{initial}}$$

Entropy can be transferred to or from a system in two forms: heat transfer and mass flow.

Heat transfer ratio at a constant absolute temperature  $T$  is called entropy flow or entropy transfer:

$$\text{Entropy transfer (T=const.)} \quad S_{\text{heat}} = Q/T$$

Evaluation of entropy change for a closed system for an internally reversible process is:

$TdS = du + PdV$  or per unit mass:

$$Tds = du + PdV \quad \text{first Gibbs equation.} \quad (3)$$

From the definition of enthalpy  $h = u + Pv$ , thus  $dh = du + PdV + v dP$  Thus:

$$Tds = dh - v dP \quad \text{second Gibbs equation.} \quad (4)$$

Explicit relation for differential changes in entropy:

$$ds = \frac{du}{T} + \frac{Pdv}{T} \quad (5)$$

$$ds = \frac{dh}{T} - \frac{vdP}{T} \quad (6)$$

The flux equation for Entropy considering and spherical cords symmetry & the speed equal to light speed is for massless particles Flux second-order equation is:  $\frac{\partial^2 P(r,t)}{c^2 \partial t^2} - \frac{\partial^2 P(r,t)}{\partial r^2} = 0$  (7)

With initial condition  $P(2R,t)=0$  si  $\text{diff}(P(0,0),r) = -R = -3.9228 \cdot 10^{22}$  Where  $P(r,t)$  represent the flux entropy.

Thus equation (2) mince that entropy has a virtual mediating particle that I call the Physical Entropy Particle  $P_{\text{En}}$  (virtual particle like an electron hole in semiconductor) with Quark: Magnetic Field, Gravity & Time. We understand by virtual mediating particle as something that exists only in statistical physics equations and obeys the Onduscular Equation (2) applicable to all bosons regardless the equations are spherical symmetry or cylindrical symmetry, with the rest mass nonhomogeneous or homogeneous OE.

Thus, Entropy particle measures the fatigue state of matter and it's complementary to Time.

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