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The physical foundation of the first and second law of thermodynamics and quantum tunnel formation

For this quarter the issues considered have been the basis for the first and second laws of thermodynamics, how tunnels can form that enable non-locality and apparent superposition, ratios of normal to dark matter and the symmetry groups underlying normal and dark matter.

The foundation of the first and second laws of thermodynamics

For thermodynamics the first law says that energy is conserved. In Loop Theory this is confirmed at the most basic level because all meons, loops, stars etc always have total energy of zero when both types of energy are considered.

It is more how the different types of energy are moved around that is at issue. The total mass type energy will always be the same in a two-particle event, and the redistribution will be balanced by the same change in charge energies.

For the second law, the physical basis is that faster rotating loops can increase the rotational rate of slower rotating loops, but not the reverse.

Entropy physically means that the motion of loops or ZMBHs through the background ZMBHs always requires energy to be lost by the moving object. This viscosity loss is absorbed by the background and could be seen as heat. The heat will permeate away from the source of the heat, but can occasionally and randomly concentrate sufficiently to set off an unmerger event that subsequently results in a big bang inflation that may or may not succeed.

This means that the motion of objects through the background and the consideration of the same object as stationary in a moving frame of reference are not the same since one loses energy and the other does not.

Quantum Tunnel Formation

The underlying physical reason for quantum phenomena like non-locality and superposition are suggested possibly to be due to the squeezing out of the ZMBH background between two loops of the same radius. This is probably how two such loops become entangled, in that they cannot be any closer other than in a photon when they mostly-merge.

This entanglement forms a void where there are no ZMBHs available to transfer forces and the result is that there are no mass or charge forces between the meons in each loop. The extension of the void to become a tunnel is by the background ZMBHs forming ZMBH loops adjacent to the meon loops and transferring the latter's mass-transmission chains to the former.

The tunnel extends further with additional ZMBH loops and the meon loops act as end caps to stop the ZMBH background from entering the void. The two meon loops continually swap ends, but take no time to do so because there is no ZMBH viscosity to slow them down.

The result is non-locality because regardless of how far apart the ends are in ZMBH space, the loops, and the effect of disturbing the tunnel to break it, happen instantaneously.

Superposition is the effect of observing the properties of the ends of the tunnel. The continual and random swapping ends by the meon loops will produce, at a tunnel end, the properties of those loops in proportion to how long each is at that tunnel end.

Normal and Dark Matter ratios

The number of loops formed from an unmerging event – a big bang – will be large and it is possible to estimate how many loops will be normal matter with three meon-pairs in each loop an how many loops will be of other pair number. The estimate of 17% normal matter to total matter is close to the 15% observed.

Symmetry Groups

The symmetry of ZMBHs as both the only force carriers and the source of unmerged pairs is simply U1. The next symmetry level concerns how one ZMBH having unmerged into a meon-pair can form 4 different states. This symmetry cannot be described in any normal symmetry system, so a novel one has been proposed as S(1)G4 which means the use of 1 unmerged pair to produce 4 different states. The two states together are U1xS(1)G4 and represent the symmetry that all loops have. The next level of symmetry can take the same form as the second level, but is concerned with the number of fermions, or equivalent, that the loops can form. This symmetry group is defined as SG(2n+2) where n is the number of meon-pairs in the loop. The overall symmetry group that describes all loops is therefore U1xS(1)G4xSG(2n+2).

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