

A first self-replicating life could have had the same chemical element of DNA: sulfur, phosphorous, oxygen, carbon, nitrogen and hydrogen.

I think that only the hydrothermal vent can transport in a zone all these elements: so that a probable origin of life could be an hydrothermal vent.

Complex molecules could have been formed with a natural chemical synthesis, with a random breaking of covalent bonds, and random recombining of covalent bond: I think that this is possible with a cracking phase and a cooling phase in water.

The chaotic process could have been obtained inside a toroidal flow near the hydrothermal vent, where nearly circular trajectory of the flow back to the chimney.

Little difference in the trajectories can give different reaction time in the cracking phase, and different reaction time in cooling phases in a similar way with genetic evolution (crossing over, deletion and translocation); so that the toroidal flow could be a non-cellular model of evolution.

If it is all true, then the first form of life should be very similar to a RNA virus that feeding with complex chemical products of the toroidal flow.

An experimental verification could be a ring pipe with a cold part and a hot part of the order of magnitude of  $700^\circ$ , with a forced circulation, with a turbulent flow obtained with a diameter of the pipe that could be  $d(\theta) = A + B\sin\left(\frac{\theta}{2}\right)$  or similar functions and a proper mass flow rate, and a high pressure environment of the order of magnitude of 100 atm and a high concentration of all the chemical elements necessary for the vital reaction.

A other possible experimental model could be a toroidal section: a disk with a hot point and a cold point on the circumference, and a forced circulation in the hot point.