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Opinion

Clustering and Synchronization in Spin Combustion

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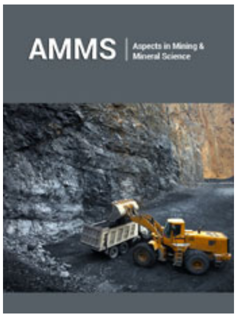

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Opinion

The scientific community interest to phenomena of synchronization in wildlife is associated, first of all, with a desire to describe the functioning of living cells. Nevertheless, it is clear that the number of objects of unanimated nature significantly exceeds the number of living organisms. Moreover, each living organism or a cell is built from unanimated elements of the periodic table. Therefore, each manifestation of synchronization in non-living systems is more exciting and interesting than the conventional synchronization inherent to living cells or viruses, both in terms of the emergence of the terrestrial life on and in terms of the greatest coverage of natural phenomena and processes (Figure 1-3). Spin combustion has been studied and detected extensively in different systems. From the gas- solid systems similar to [1] up to termites [2,3]. Both experimental [1-3] and numerical data [4-6,7] concerning this phenomenon have been obtained up today. Nevertheless, both the volumes of these data were analyzed separately in fact. Therefore, some important peculiarities of spin combustion have been actually lost and need to be pointed out especially now. I am only going to remind again results [1] to a reader, and to conduct here their joint analysis with calculations [4-7] in terms of modern achievements of the theory of complex systems [8]. The analysis allows me to argue that spin combustion itself behaves like complex systems. In particular, when spin combustion is initiated, the clustering effect which is schematically illustrated in (Figure 1). happens as a rule already at the earliest stage of spin ignition (see also data [9]). clustering at first not seen in an early work [10], was revealed later in 3-dimensional modeling [11].

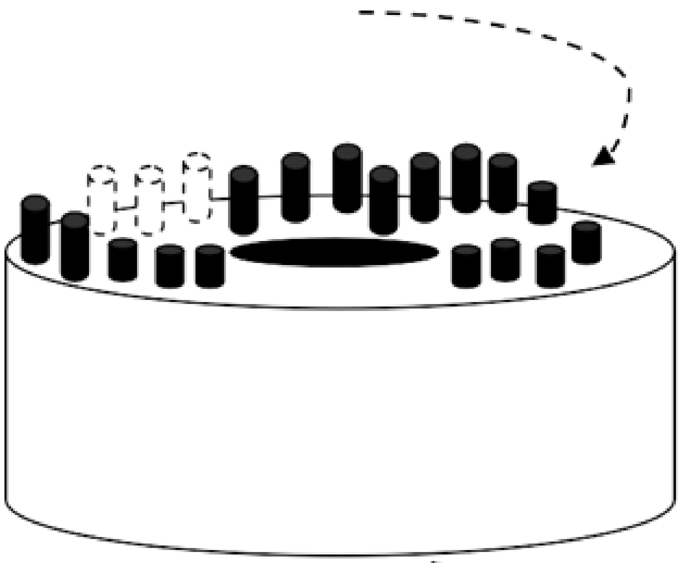

Figure 1: Single-headed spin combustion ignition. Side view of the recalculated results [1] at 0< t<≈ ta (disk-shaped sample) schematically.

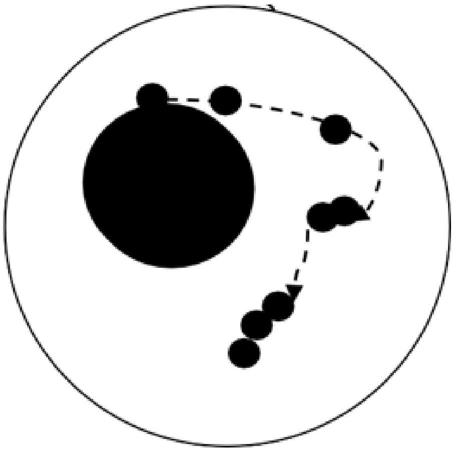

Figure 2: Clustering of a single-headed spin into double-headed or triple-headed spin combustion modes consistently at t=tb≈>1.29 ta. Top view of the recalculated results [1] schematically.

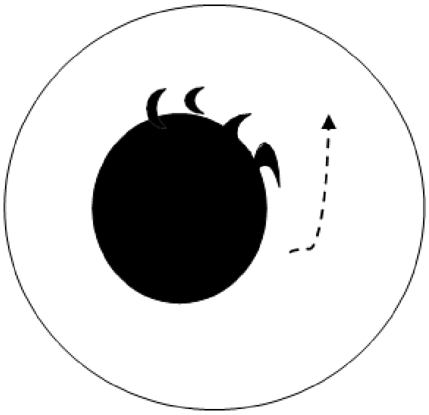

Figure 3: Formation of a saw-tooth structure, STS, (was observed numerically only [7]) Top view of STS schematically at $t=t_c>\approx 2.58\ t_a$.

Conclusion

One may conclude that spin combustion may be attributed to complex systems.

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