Seminar:

Thursday, December 15th 2022, 03:00 pm

Aula AP2, DIFC, Viale delle Scienze Ed. 18

CONTAGION AND SYNCHRONISATION IN SOCIAL SYSTEMS WITH HIGHER-ORDER INTERACTIONS

Prof. Vito Latora, School of Mathematical Sciences, Queen Mary University of London

And Dipartimento di Fisica and INFN, University of Catania

Keywords: Complex networks, Higher-Order interactions

Abstract: Complex networks have been successfully used to describe the spread of diseases in populations of interacting individuals. Conversely, pairwise interactions are often not enough to characterise social contagion processes, such as the formation of opinions or the adoption of novelties in social systems, all cases where more complex mechanisms of influence and reinforcement are at work. I will first present a higher-order model of social contagion in which a social system is represented by a simplicial complex and contagion can occur through interactions in groups of different sizes [1]. The model shows the emergence of a discontinuous phase transition, a novel phenomenon induced by the presence of higher-order interactions, and of a bistable region where healthy and endemic states co-exist. This result can have practical implications, because it can help explaining why critical masses are required to initiate social changes. I will then discuss other examples of significant effects of higher-order interactions in social processes, showing how interactions in groups of different sizes affects the evolution of cooperation [2] or the stability of synchronised states in simplicial complexes of coupled dynamical systems [3].

REFERENCES

[1] https://www.nature.com/articles/s41467-019-10431-6

[2] https://www.nature.com/articles/s41562-020-01024-1

[3] https://www.nature.com/articles/s41467-021-21486-9