

*Im Rahmen des Physikkolloquiums spricht*

**Prof. Dr. Yurij Holovatch**

*Institute for Condensed Matter Physics, National Acad. Sci. of Ukraine, Lviv, Ukraine*

*L4 Collaboration & Doctoral College for the Statistical Physics of Complex Systems,  
Leipzig-Lorraine-Lviv-Coventry, Europe*

über

## **Complex systems: physics beyond physics**

### Abstract:

Complex systems are composed of many interacting parts, often called agents, which display collective behavior that does not follow trivially from the behaviors of the individual parts. Inherent features of complex systems incorporate self-organization, emergence of new functionalities, extreme sensitiveness to small variations in the initial conditions, governing power laws (fat-tail behaviour). The study of complex systems forms a new interdisciplinary research area that cuts across physics, biology, ecology, economics, sociology, and the humanities. In this talk I will review the essence of complex systems from a physicists' point of view, and try to clarify what makes them conceptually different from systems that are traditionally studied in physics. The examples will be taken from several areas of complex systems science that are currently studied extensively: the science of cities, dynamics of societies, and the representation of texts as evolutionary objects.

P. Sarkanych, N. Fedorak, Yu. Holovatch, P. MacCarron, J. Yose, R. Kenna. arXiv:2203.10399 (submitted to *Adv. Compl. Syst.*)

V. Palchykov, M. Krasnytska, O. Mryglod, Yu. Holovatch. *Adv. Complex Syst.* (2021) 2140001

M. Krasnytska, B. Berche, Yu. Holovatch, R. Kenna. *Entropy*, **23**(9) (2021) 1175.

Yu. Holovatch, R. Kenna, S. Thurner. *Eur. Journ. Phys.* **38** (2017) 023002