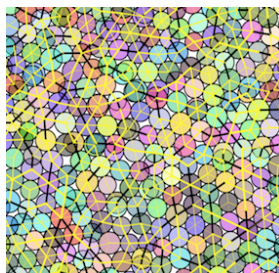


Disorder in Complex Systems



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The statistical physics of cities

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Abstract: Modelling the structure and evolution of cities is critical because policy makers need robust theories and new paradigms for mitigating various important problems such as air pollution, congestion, socio-spatial inequalities, etc. Fortunately, the increased data available about urban systems opens the possibility of constructing a quantitative ‘science of cities’ with the aim of identifying and modelling essential phenomena. Statistical physics plays a major role in this effort by bringing tools and concepts able to bridge theory and empirical results. In these lectures, I will illustrate this point by discussing different topics: the distribution of urban population, segregation phenomena and spin like models, the polycentric transition of the activity organization, energy considerations about mobility and models inspired by gravity and radiation concepts, CO₂ emitted by transport, and finally scaling that describes how various socio-economical and infrastructures evolve when cities grow.

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