



PSI Colloquium

Dragon-Kings, Black Swans and Predictions: diagnostic for the coming crises in population, environmental, health, economic and financial systems

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DATE : Friday, May 24, 2013
COFFEE: 11:00 am
SEMINAR: 11:15 am
PLACE: WHGA/001

Abstract:

We present a conceptual framework to quantify, model and predict crises in out-of-equilibrium open heterogeneous dynamical systems (i.e. almost all systems of interest) based on a synthesis of the theory of the renormalization group in statistical physics and bifurcation theory in mathematics combined with systematic empirical data analyses.

This approach suggests that most important crises (positive or negative) are associated with bifurcations and change of regimes ("phase transitions"), which lead to specific knowable precursors. These crises are consequently obeying different statistical properties that I have summarized under the term "dragon-kings".

I apply this conceptual framework to the analysis of the convergence of challenges facing mankind, including financial derivative induced instabilities, debt instability, epidemics of obesity and chronic diseases, aging and financial retirement liabilities, the energy challenges, the water problem, the soil erosion run-away, the on-going sixth largest biological extinction, extreme industrial disasters, coupled with geopolitical risks, the problem of the stability of societies that need to steer responsible management of exploding amounts of toxic wastes, summed up by the concept of the "anthropocen" era that characterize the human footprint on Earth and the conjecture of an approaching transition of the global biosphere state.