

Abstract for GR-TR Conference on Statistical Mechanics and Dynamical Systems

Topic: Synchronization of Nonlinear Systems

Preference: Poster

System size driven coherence in complex networks

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We study the onset of collective behavior in networks of heterogeneous dynamical systems. We show that a coherent dynamical state emerges in the limit of large networks if the network is increasingly not susceptible to failures, that is, if the difficulty to break the network into disconnected parts grows with the network size. In such case, increasing the network size above a critical size leads the dynamical behavior of the nodes systems to be highly correlated. Our results provide a way to enhance coherent motion in general networks by controlling its local properties.