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Epidemics on Interacting Networks MARK DICKISON, Boston University, SHLOMO HAVLIN, Bar-Ilan University, H.E. STANLEY, Boston University — Epidemic spreading is of great importance in public health, as well as in related fields such as infrastructure. While complex network models have been used with great success to analyze epidemic behavior on single networks, the reality is that our world is made up of a system of interacting networks that do not necessarily share common characteristics. I introduce a model for constructing interacting networks and show that the phase transtion depends on the parameters $\kappa_T, kappa_A$ and κ_B, where $\kappa_T = \langle k^2 \rangle / \langle k \rangle$ over the nodes in both networks, including internetwork links, and κ_A and κ_B are over the networks considered individually, with no internetwork links. For strongly interacting networks ($\kappa_T > \kappa_A and \kappa_B$), there exists only one phase transition, between a disease-free phase and an epidemic phase across both networks. For weakly interacting networks ($\kappa_T < \kappa_A$ or κ_B), a third, "mixed," phase exists, where the disease enters an epidemic on one network alone. The analytic predictions are confirmed by Monte-Carlo simulations.

[X] Prefer Oral Session
[ ] Prefer Poster Session

Mark Dickison
dickison@bu.edu
Boston University

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