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Julius Edgar Lilienfeld Prize Talk: Catastrophic cascade of failures in interdependent networks

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We study interdependent networks, where nodes fail in one network, cause dependent nodes in another network to also fail. We provide a framework for understanding the robustness of such interacting networks. We calculate the critical fraction of nodes that upon removal will lead to a failure cascade and to a complete fragmentation of two interdependent networks. Surprisingly, while for a single network a broader degree distribution results in the network being more robust to random failures, for interdependent networks, the broader the distribution is, the more vulnerable the networks become to random failures.