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Inferring Complex Network Topology from Spatio-Temporal Spike Patterns FRANK VAN BUSSEL, BIRGIT KRIENER, MARC TIMME, Max Planck Institute for Dynamics and Self-Organization, Goettingen, Germany — The problem of reconstructing or reverse-engineering the connectivity of networks consisting of dynamically interacting units has become an active area of study in fields such as genetics, ecology, and neuroscience. The collective dynamics of such networks is often sensitive to the presence (or absence) of individual interactions, but there is commonly no direct way to probe for their existence. We present an explicit method for reconstructing neuronal networks from their spiking activity. The approach works well for networks in simple collective states, but is also applicable to networks exhibiting complex spatio-temporal spike patterns. In particular, stationarity of spiking time series is not required.

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