

Abstract Submitted  
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**Reconstructing Weighted Networks from Dynamics**<sup>1</sup> EMILY S.C. CHING, Department of Physics, The Chinese University of Hong Kong, P.Y. LAI, Department of Physics, Graduate Institute of Biophysics, and Center for Complex Systems, National Central University, C.Y. LEUNG, Department of Physics, The Chinese University of Hong Kong — The knowledge of how the different nodes of a network interact or link with one another is crucial for the understanding of the collective behavior and the functionality of the network. We have recently developed a method that can reconstruct both the links and their relative coupling strength of bidirectional weighted networks. Our method requires only measurements of node dynamics as input and is based on a relation between the pseudo-inverse of the matrix of the correlation of the node dynamics and the Laplacian matrix of the weighted network. Using several examples of different dynamics, we demonstrate that our method can accurately reconstruct the connectivity as well as the weights of the links for weighted random and weighted scale-free networks with both linear and nonlinear dynamics.

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