

Abstract Submitted  
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**Renormalization Group Classification of Critical Phenomena in Complex Networks**<sup>1</sup> STEFAN BOETTCHER, TRENT BRUNSON, Physics Dept, Emory University — We discuss critical phenomena for a variety equilibrium statistical models on hierarchical networks with long-range bonds. An exact renormalization group (RG) study reveals that the observed critical behavior, albeit non-universal, can be classified into three generic categories. The non-universality is a direct result of the existence of long-range bonds, while the categories derive from their relative coupling strength. One of these categories is characterized by an infinite-order transition similar in appearance to the Kosterlitz-Thouless type, which has been observed recently in a number of network problems. Our result, if applicable to a wider set of networks, may explain the prevalence of such transitions, and may provide the basis for a generalized RG classification of criticality in complex networks.

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