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**Amir Ghasemian\***, amgh5286@colorado.edu, and **Pan Zhang, Aaron Clauset, Cristopher Moore** and **Leto Peel**. *Detectability Limits in Dynamic Networks*.

Detectability limit is an interesting question in the extensively studied community detection problem. In this work we study the detectability limit in dynamic networks. Our model for dynamic networks (which is a special case of many other models) characterizes the interactions independently at each time slot through the regular stochastic block model (SBM) and the role assignments of each node are modeled as a markov chain across the time dimension. Using this model we will find the detectability threshold of dynamic networks as a function of rate of change and the strength of communities. Below this threshold we claim that no efficient algorithms can identify the communities better than chance. We also propose two algorithms that are optimal in the sense that they succeed all the way down to this threshold. The first algorithm uses belief propagation to infer the role assignments, which gives asymptotically the optimal accuracy, and the second one is a fast spectral clustering algorithm based on linearizing the BP equations around the trivial fixed point solutions. (Received February 21, 2017)