1156-62-298 **Yash Deshpande*** (yash@mit.edu), 77, Massachusetts Ave., E17-481, E17-481, Cambridge, MA 02139. *Contextual Stochastic Block Models.*

Stochastic block models are a popular model for inference of latent communities in network data. In this work, we extend the stochastic block model with to annotated networks, wherein we have access to per-vertex covariate information. We provide the first information theoretic tight analysis for inference of latent community structure given a sparse graph along with high dimensional node covariates, correlated with the same latent communities. Our work bridges recent theoretical breakthroughs in the detection of latent community structure without nodes covariates and a large body of empirical work using diverse heuristics for combining node covariates with graphs for inference. The tightness of our analysis implies in particular, the information theoretical necessity of combining the different sources of information. Our analysis holds for networks of large degrees as well as for a Gaussian version of the model. (Received January 27, 2020)