1160-60-174 **Kavita Ramanan*** (kavita_ramanan@brown.edu), RI , and **Ankan Ganguly**. *Approximations for Interacting Particle Systems on Tree-like Graphs.* Preliminary report.

We consider interacting particle systems with particles indexed by the nodes of a locally finite graph, and whose evolution is described by a (possibly non-Markovian) jump process on a countable state space, where the transitions of each particle depends only on the states of particles in its neighborhood. Models that fall under this framework include the contact process, voter model and neuronal Hawkes process. We establish limit theorems for the dynamics and empirical measures when the graphs converge (in the local weak sense) to a limit infinite graph. Moreover, when the limit graph is tree-like, we provide an autonomous characterization of the dynamics of a typical particle and its neighbors in terms of certain local equations. These local equations can be viewed as the sparse analog of mean field equations, which are used to approximate interacting particle systems on dense graphs. Along the way we establish a Markov random field property of the dynamics and an extension of the Clifford-Hammersley theorem that may be of independent interest. (Received August 09, 2020)